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Grasses of the Columbia Basin of British Columbia

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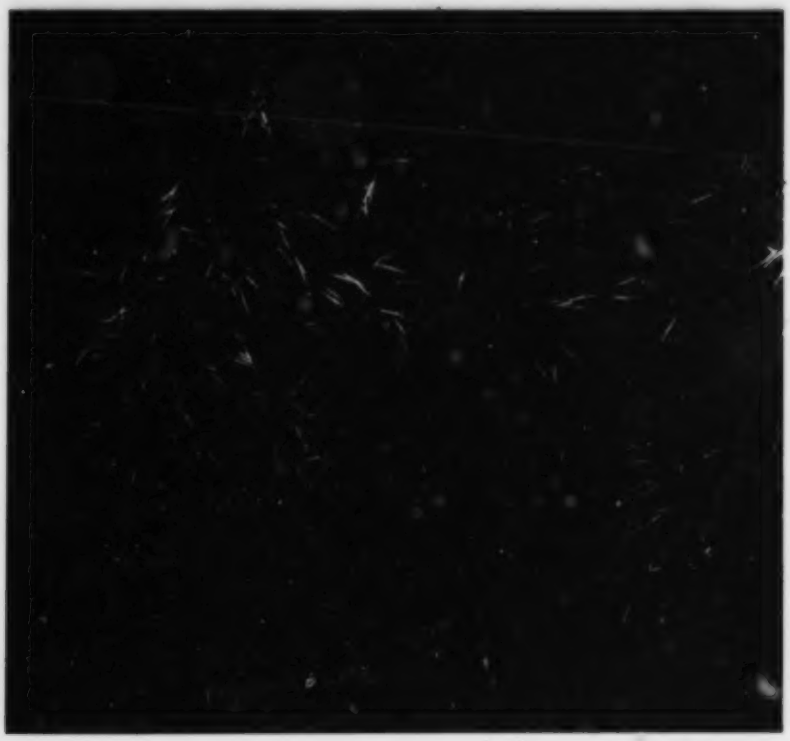

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Grasses of the Columbia Basin of British Columbia

Heather Stewart and Richard J. Hebda

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ABSTRACT

The Grasses of the Columbia Basin of British Columbia

A checklist of 152 grass species for the Columbia Basin region was developed using the specimen database at the Royal British Columbia Museum Herbarium. This represents approximately 67 percent of the grass flora in the province of British Columbia. From this study it was determined that only 25 percent of the grass flora in the Columbia Basin region are introduced species. Each record in the checklist has an associated specimen housed at the Herbarium, except in the case of several of the Red- and Blue-listed specimens described in Douglas et al. (1998). The naming follows Douglas et al. (1994) in most cases, but some genera were changed to reflect changes in taxonomic thinking. Non-technical descriptions and keys were written and maps generated for each species. The maps were generated using a Geographic Information System from the geographic coordinates in the database records. The base map is from the Watershed Atlas data available in digital format from the Ministry of Environment, Lands and Parks website. The watershed base map was clipped to the study area determined by the *Living Landscapes* program for the Columbia Basin region at the museum and the point data from the database were added. The map points represent actual specimen locations that can be traced back to a herbarium sheet. Many species that show limited distribution may prove to be more widely distributed as a result of more extensive field work. Illustrations are provided for both the key species and individual species.

ACKNOWLEDGEMENTS

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The illustrations in this publication come from two sources. One source is the collection of grass illustrations completed by Betty Stephens, retired staff illustrator at the Royal B.C. Museum. These illustrations have been used in previous RBCM publications and scientific papers. In addition, there are several illustrations completed by Peggy Frank from the RBCM publication on *Bromus* by Leon Pavlick (1994). The bulk of the illustrations in this publication are taken, with permission from the University of Washington Press, from C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson's 1955–1969 *Vascular Plants of the Pacific Northwest.*

Scott Scholefield, a co-op student from University of Northern British Columbia, spent several months working with the database to produce the ArcView digital maps.

Base maps are from Ministry of Environment, Lands and Parks 1996 watershed data. Bruce Mackenzie, GIS Technical Analyst, provided helpful information on these.

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Joan Kerik and John Pinder-Moss, collection managers at the RBCM Herbarium helped Scott, Karen Moores and Jean MacGregor compile the original database. Tracy Coyle, RBCM, produced the HTML version of this publication, and Tara Steigenberger, RBCM, manipulated the bulk of graphics and edited the manuscript. Paul Smith assisted with close-up photography. Peter Newroth helped monitor this project and arrange for the printing of the manuscript.

This publication is web-based, and as more information comes in from the region on new and interesting grasses, we plan to update the web publication. If you have any comments or suggestions please forward these to: tsteigenberg@royalbcmuseum.bc.ca or rhebda@royalbcmuseum.bc.ca

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The Columbia Basin region, as described in this treatment, and represented by the *Living Landscapes* program (Figure 1a) is bounded to the west by the ridge line of the Monashee and Columbia Mountains and to the south by the Canada/U.S. border. On the eastern boundary is the British Columbia/Alberta border through the Rocky Mountains and the northern limit is at Valemont. The Columbia Basin region is made up of four mountain ranges, the Monashee/Columbia, Selkirk, Purcell, and the Rocky Mountains. The intervening valleys of these ranges have long lake chains such as the Kinbasket/Columbia/Koocanusa River system, the Kootenay Lake/Duncan Lake system, the Slocan Lake/Kootenay River system, and the Arrow Lakes. The region falls within the Southern Cordilleran and the Interior Cordilleran Ecoclimatic zones. The climate of this region is strongly moderated by the continental influences and this means that humidity and precipitation are reduced from that of the Pacific Coastal region.

Where grasses are commonly located in the Columbia Basin region

When people think of grasses in British Columbia, they usually think of the extensive grasslands of the Southern Interior and the Rocky Mountain Trench. But throughout British Columbia, grasses grow in every terrestrial environment from slightly submerged shoreline to mountaintop. In the Columbia Basin region, grasses inhabit open forests, wetlands, and the alpine zone, especially along the rocky ridges and talus slopes. Grasses often predominate in the dry valley bottoms and slopes, too. (See Table 1 and Appendix 1.)

Grasses of the biogeoclimatic zones According to the biogeoclimatic (BEC) mapping of forested ecosystems (Meidinger and Pojar, 1991) there are seven biogeoclimatic zones (Figure 1b), located in the *Living Landscapes* study area of the Columbia Basin region. These are Alpine Tundra, Engelmann Spruce–Subalpine Fir, Montane Spruce, Sub-Boreal Spruce, Interior Cedar–Hemlock, Interior Douglas-fir, and Ponderosa Pine. All of these zones, though dominated by tree species, have grasses associated with them.

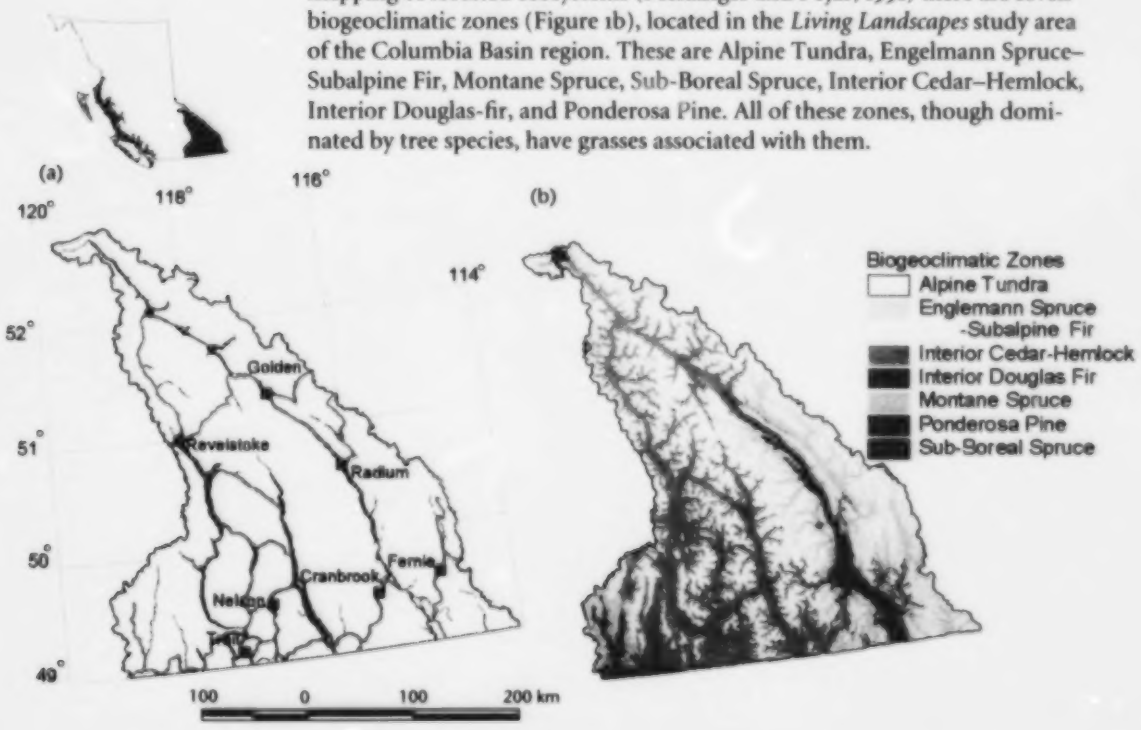


FIGURE 1 *Maps of the Columbia Basin region showing (a) human settlement and (b) biogeoclimatic zones.*

TABLE 1 *Biogeoclimatic zones of the Columbia Basin region and associated grass species (adapted from species lists in Meidinger and Pojar 1991)*

Biogeoclimatic zone	Common name	Scientific name
Alpine Tundra above 2250 m elevation	Alpine Fescue	*Festuca brachyphylla*
	Rough Fescue	*Festuca campestris*
	Green Fescue	*Festuca viridula*
	Fuzzy-spiked Wildrye	*Leymus innovatus*
	Slender Wheatgrass	*Elymus trachycaulus*
	Glaucous Bluegrass	*Poa glauca*
	Purple Reedgrass	*Calamagrostis purpurascens*
	Timber Oatgrass	*Danthonia intermedia*
	Arctic Bluegrass	*Poa arctica*
Engelmann Spruce–Subalpine Fir from 1500 to 2300 m	Rough Fescue	*Festuca campestris*
	Green Fescue	*Festuca viridula*
Montane Spruce from 1250 to 1700 m	Pinegrass	*Calamagrostis rubescens*
	Bluebunch Wheatgrass	*Pseudoroegneria spicata*
	Idaho Fescue	*Festuca idahoensis*
Sub-Boreal Spruce from valley bottom to 1100–1300 m	Pinegrass	*Calamagrostis rubescens*
	Rough-leaved Ricegrass	*Oryzopsis asperifolia*
Interior Cedar–Hemlock from 400 to1500 m	Bluebunch Wheatgrass	*Pseudoroegneria spicata*
Interior Douglas-fir from 350 to 600 m	Bluebunch Wheatgrass	*Pseudoroegneria spicata*
	Pinegrass	*Calamagrostis rubescens*
	Idaho Fescue	*Festuca idahoensis*
	Rough Fescue	*Festuca campestris*
	Junegrass	*Koeleria macrantha*
	Kentucky Bluegrass	*Poa pratensis*
Ponderosa Pine lowland to 350 m	Bluebunch Wheatgrass	*Pseudoroegneria spicata*
	Sandberg's Bluegrass	*Poa secunda*
	Cheatgrass	*Bromus tectorum*
	Alkali Saltgrass	*Distichlis spicata*
	Rocky Mountain Fescue	*Festuca saximontana*
	Rough Fescue	*Festuca campestris*
	Junegrass	*Koeleria macrantha*

Within each of these zones, different grass species grow in different habitats, influenced by soil moisture, chemistry, and disturbance, such as fire, grazing, and human activity. Surprisingly, grasses are often associated with forests, especially open ones. It is very difficult to classify "open" forests. Are they forests or grasslands? Often the most abundant species are grasses but they grow under a canopy of trees, so we think of open forest as a forest type. In some sites, grassland continues right in under the trees and the same species appear in both communities, yet one is classified as forest and the other grassland. Consequently, though forests cover much of the Columbia Basin region, grasses constitute a major element of the flora.

In addition to the grass species naturally associated with forests, there are species that occur because of human activities. Habitats include pastures, lawns, improved rangeland, and weedy sites. Most of the species of these situations were introduced and have spread along roadside ditches, into abandoned fields, and in waste places. Of the 152 grass species in this study, 40 originated outside of North America, and in some cases these were planted to improve existing grassland or to stabilize slopes after road construction.

Grasses of wetlands Perhaps the most predominant, yet often overlooked, grassland communities in the Columbia Basin region are those that withstand repeated flooding. These are habitats that are broadly classified as bogs, fens, marshes, and swamps. A preliminary wetland classification for the region (W. MacKenzie, pers. comm., 1999), lists 22 wetland community types. Common wetland grass species are Bluejoint (*Calamagrostis canadensis*), Fowl Mannagrass (*Glyceria striata*), Reedgrass (*Glyceria grandis*), Wood Reed Grass (*Cinna latifolia*), Common Reed (*Phragmites australis*), Reed Canary Grass (*Phalaris arundinacea*), and Spike Bentgrass (*Agrostis exarata*).

TABLE 2 *Wetland types of the Columbia Basin region and associated grass species (adapted from preliminary draft data from wetland classification [W. MacKenzie, pers. comm., 1999])*

Wetland type	Plant association	Common name	Scientific name
Bog	Lodgepole Pine–Labrador Tea-Peat Moss	Bluejoint	*Calamagrostis canadensis*
	Lodgepole Pine–Interior Spruce-Bog Laurel–Peat Moss		none
Fen	Pine-Water Sedge–Peat Moss	Bluejoint	*Calamagrostis canadensis*
	Scrub Birch–Water Sedge	Spike Bentgrass	*Agrostis exarata*
		Bluejoint	*Calamagrostis canadensis*
	Scrub Birch–Buckbean–Peat Moss	Hair Bentgrass	*Agrostis scabra*
		Bluejoint	*Calamagrostis canadensis*
	Beaked Sedge–Water Sedge	Alpine Bentgrass	*Agrostis humilis*
		Bluejoint	*Calamagrostis canadensis*
		Slimstem Reedgrass	*Calamagrostis stricta*
		Reed Mannagrass	*Glyceria grandis*
	Tufted Clubrush–Star Moss	Bluejoint	*Calamagrostis canadensis*
		Timber Oatgrass	*Danthonia intermedia*
		Fescue	*Festuca* spp.
	Narrow-leaved Cottongrass–Shore Sedge	Bluejoint	*Calamagrostis canadensis*
		Common Sweetgrass	*Hierochloe odorata*
	Few-flowered Spikerush–Hook Moss	Hair Bentgrass	*Agrostis scabra*
		Bluejoint	*Calamagrostis canadensis*
		Alpine Timothy	*Phleum alpinum*
	Slender sedge–Buckbean	Bluejoint	*Calamagrostis canadensis*
	Slender sedge–Hook Moss	Bluejoint	*Calamagrostis canadensis*
		Reed Mannagrass	*Glyceria grandis*
Swamp/bench	Drummond Willow–Bluejoint	Bluejoint	*Calamagrostis canadensis*
		Nodding Wood-reed	*Cinna latifolia*
		Fowl Mannagrass	*Glyceria striata*

TABLE 2 *Continued*

Wetland type	Plant association	Common name	Scientific name
Swamp	Mountain Alder–Hardhack–Water Sedge	Bluejoint	*Calamagrostis canadensis*
		Reed Mannagrass	*Glyceria striata*
		Mannagrass	*Glyceria* spp.
	Spruce–Pine–Subalpine Fir–Skunkcabbage–Peat Moss	Bluejoint	*Calamagrostis canadensis*
	Sitka Willow–Small-flowered Bulrush	Bluejoint	*Calamagrostis canadensis*
		Nodding Wood-reed	*Cinna latifolia*
	Sitka Willow–Water Sedge	Hair Bentgrass	*Agrostis scabra*
		Bluejoint	*Calamagrostis canadensis*
		Slimstem Reedgrass	*Calamagrostis stricta*
	Reed Canary Grass-Cleared	Reed Mannagrass	*Glyceria grandis*
		Reed Canary Grass	*Phalaris arundinacea*
Marsh	Common Reed Marsh	Reed Canary Grass	*Phalaris arundinacea*
		Canada Bluegrass	*Poa compressa*
		Kentucky Bluegrass	*Poa pratensis*
		Brome	*Bromus* spp.
	Common Spike Rush	Spike Bentgrass	*Agrostis exarata*
		Little Meadow-foxtail	*Alopecurus aequalis*
		Northern Mannagrass	*Glyceria borealis*
		Reed Canary Grass	*Phalaris arundinacea*
		Fowl Bluegrass	*Poa palustris*
		Nuttall's Alkaligrass	*Puccinellia nuttalliana*
	Cattail	Redtop	*Agrostis gigantea*
			Phalaris arundinacea
	Bulrush		none

Horse paddock at Fort Steele

Grasses of disturbed sites Disturbed urban and suburban sites are great places to look for grasses.

Roadsides and railroad verges support a wide range of mostly introduced, invasive or foreign species. For example, at Revelstoke, in the zone between the rail bed and main street, common species are Quackgrass (*Elymus repens*), Kentucky Bluegrass (*Poa pratensis*), Orchard Grass (*Dactylis glomerata*), Green Bristlegrass (*Setaria viridis*), Timothy (*Phleum pratense*), and Reed Canary Grass (*Phalaris arundinacea*); found in the ditch, Smooth Brome (*Bromus inermis*), Common Witchgrass (*Panicum capillare*), and Redtop (*Agrostis gigantea*). Of these, Quackgrass is probably the most universal in its occurrence in urban lots, roadsides, and back alleys.

At Grand Forks, which has a drier and hotter climate, many of the same species occur in disturbed sites, especially Quackgrass. Other common grasses include several species of Bluegrass such as Kentucky Bluegrass (*Poa pratensis*), Canada Bluegrass (*Poa compressa*), and Bulbous Bluegrass (*Poa bulbosa*), as well as Cheatgrass (*Bromus tectorum*), Tall Wheatgrass (*Thinopyrum ponticum*), and Crested Wheatgrass (*Agropyron cristatum*) (abundant in dry stony sites), Stink Grass (*Eragrostis cilianensis*), and scattered annual Fescues (*Vulpia* spp.). The highway roadside and ditch west of Grand Forks supports a thriving population of Wild Oat (*Avena fatua*) and Wheat (*Triticum aestivum*).

An abandoned dumpsite in Nelson had a healthy population of Large Barnyard Grass (*Echinochloa crusgalli*), Wild Oat (*Avena fatua*), and Wheat (*Triticum aestivum*).

Historically, botanists have paid little attention to these weedy species mentioned above and have concentrated on the native species in undisturbed situations. The presence of these grasses is so common that we almost forget that they are there. These are the grasses that grow in most of our communities and they are a good way to get started when looking at grasses.

Grassland history

Today, in the Columbia Basin region, extensive grasslands occupy valley bottoms in dry or wet settings. In the past though, grasslands dominated the landscape. Following the retreat of the Cordilleran Ice Sheet about 13 000 years ago in the cool, Arctic-like climate, pioneering grasslands included sage, sedges, and grasses. Between 10 000 and 8000 years ago, grasslands extended above
1300 m during a climate warmer and drier than today. Sage (*Artemisia* spp.) and grasses occurred widely at this time. The initial tree stands developed into extensive forests as the climate began to moisten from 7000 to 4000 years ago. Later, much of the landscape was dominated by Douglas-fir (*Pseudotsuga menziesii*), larch (*Larix* spp.), lodgepole pine (*Pinus contorta*), and spruce (*Picea* spp.). Forest species expanded further downslope as the climate cooled 4000 years ago. Grasslands became confined to either the hot dry areas at low elevation, or places where trees could not grow, such as wetlands, slides, floodplains, or edges of meandering creeks.

Why grasses are well suited to extremes

Grasses are the only family of plants able to withstand cool-moist, hot-dry, or completely wet and almost submerged conditions because of their unique structural adaptations. They can also withstand grazing and fire. The fibrous roots of some annual grasses enable them to establish quickly in the wet mud of a marsh; other wetland grass species grow fibrous root masses to avoid being washed away in moving water. In dry situations, certain grass species grow in clumps (bunch grasses) to prevent the roots from drying out, and to prevent the soil from being lost around the root mass. In grass, the tissue responsible for growth (crown), is located toward the base of the leaf or shoot near the root, rather than at the tip as in other plants. This arrangement allows the grass to regenerate after it gets cropped or burned.

Silica bodies in the leaf cells prevent leaves from wilting in hot, dry conditions and these sharp silica bodies also protect the leaf. Remember the first time you ran your hand along the edge of a fresh blade of grass and got a cut? This doesn't stop cows, horses, sheep, and their wild counterparts, which have tough mouth parts, continuously growing teeth, and several stomachs, from digesting the tough fibres. Some grass species adapt to dry conditions by rolling their leaves inward or folding them to prevent water loss from the surface. A broad leaf surface means more surface area for evaporation.

Grasses are wind-pollinated, so they do not need showy flowers to attract insect pollinators. Grasses that grow in dry areas—where seeds need to be buried to ensure enough moisture for seed germination—tend to have long awns and a narrow cylinder-like form to allow the seeds to move along cracks in the soil particles. Grass seeds are dispersed by many methods, but grasses do not need to produce seed to disperse. Most grasses can spread vegetatively by forming tufts or by rhizomes. The tufted type of grass species move out from a central parent, and the younger plants occur around the

outside of the parent plant. Rhizomes are the favoured mode of dispersal for a large number of wetland grasses. In high water levels, parts of the rhizome break off and float to new sites, along eroding banks and gravel bars. Other grass species form small "live" bulblets or plants that start growing when they fall off the mother plant. Some species of the Bluegrass (*Poa*) genus have only female plants and set seed without pollen. The flowers of the annual Fescues (*Vulpia* spp.) do not open for pollination; instead, the flower remains closed and the seed is set using pollen from the same plant. Using vegetative methods, grasses are not dependent on seed set but can get established in extreme areas before other pioneering species can set seed.

Although the leaf blades are the prime food source for many grazing animals, the seeds provide critical nutrition to rodents, birds and waterfowl, and humans. In fact, the fruit of one grass—Wheat—is central to our daily diet. Other important grasses in our diet are Rye, Rice, Corn, and Oats. Even sugar, which comes from Sugar Cane (*Saccharum officinarum*), is from a grass. Grasses were important to British Columbia's First Peoples for many household tasks such as making bedding, lining steam pits, covering berry baskets, decorating baskets, and making food-drying mats.

Why native grasslands are important in the Columbia Basin region

In the Montane Cordillera area of British Columbia, the grasses (Poaceae) are second only to the sedges (Cyperaceae) in numbers of species. Douglas et al. (1994) listed 243 species of grasses in British Columbia. The collection at the Royal British Columbia Museum has vouchers for 152 species in the Columbia Basin region. These numbers give the impression that grass species occur commonly in the Columbia Basin region, but these numbers hide the changes occurring in the region.

There are currently (1999) six grass species in the Columbia Basin region on the B.C. Conservation Data Centre's Red List. A Red-listed species is a candidate for legal designation as endangered or threatened. The Columbia Basin region Red-listed species are:

Blue Gramagrass (*Bouteloua gracilis*)
Water Hairgrass (*Catabrosa aquatica*)
Foxtail Muhly (*Muhlenbergia andina*)
Little Bluestem (*Schizachyrium scoparium*)
Prairie Wedgegrass (*Sphenopholis obtusata* var. *major*)
Prairie Wedgegrass (*Sphenopholis obtusata* var. *obtusata*)

There are also ten Blue-listed species in the Columbia Basin region. A Blue-listed species is a vulnerable grass that could easily become a candidate for the Red List in the future because of changes in its occurrence. The Blue-listed candidates are:

Plains Reedgrass (*Calamagrostis montanensis*)
Slender-spiked Mannagrass (*Glyceria leptostachya*)
Slender Mannagrass (*Glyceria pulchella*)
Oniongrass (*Melica bulbosa*)
Smith's Melic (*Melica smithii*)
Purple Oniongrass (*Melica spectabilis*)
Marsh Muhly (*Muhlenbergia glomerata*)
Rivergrass (*Scholochloa festucacea*)
Porcupine Grass (*Stipa spartea*)
Wolf's Trisetum (*Trisetum wolfii*)

Some species are placed on the Red and Blue Lists because they grow at the edge of their geographic range; others because they have very particular habitat needs (e.g., high alkalinity) or their habitats are being lost to development. Some rare species are being displaced by introduced species such as Knapweed (*Centaurea* spp.). Surprisingly, there are only 40 introduced species (brought into the area from outside North America) among the 152 species, representing about 25 percent of the grass flora. These numbers hide the fact that introduced grasses occupy a larger area than do the native grasses. In overgrazed grassland, a sea of Cheatgrass (*Bromus tectorum*) usually dominates, with scattered native species.

A native grassland has a majority of native grass species and has not been "improved" by the addition of introduced species. Today in the Columbia Basin region it is difficult to find native grassland because pasture grasses have been sown into natural open habitats. In an effort to re-establish native grass species on disturbed sites, native grass seed mixtures are now used to revegetate roadsides, campgrounds, streambanks, and some grasslands. It is only through this reintroduction of native grass species, and conscientious habitat management, that we can hope to restore the biodiversity of grasslands in the Columbia Basin region. Grasslands do not require a "hands off" policy to protect them, but they are vulnerable to development and overmanagement.

Past collection history in the region

Herbarium databases reflect the activity and movements of earlier botanists in a region. To a degree, the apparent distribution of a species from herbarium records reflects the ease of travel of botanists on the landscape. In general, maps stimulate questions about distribution gaps and the concentration of species data. The earliest recorded grass specimen collected in the Columbia Basin region in the Royal British Columbia Museum's database is one collection by J.R. Anderson in 1895. Collection growth remained slow until J.W. Eastham began collecting in the 1930s. This collection of grasses remains one of the Royal B.C. Museum's largest. George Hardy, past curator at the Museum, collected in the region in the 1940s. Fred Fodor, Marc Bell, and James Calder collected extensively in the 1950s and '60s. The bulk of the collection was amassed in the 1970s and '80s when curators such as Chris Brayshaw, Adolf Ceska, Robert Ogilvie, and Leon Pavlick spent time collecting in the Columbia Basin region, especially along the Rocky Mountain Trench. David and Alan Polster collected large amounts of material in 1975 and 1976 from the Akamina and Kishinena Creeks area. Hans Roemer, botanist with Provincial Parks, has deposited large collections of grass specimens from the region. In recent years, the Conservation Data Centre has added voucher material representing rare species.

The plant species checklist was developed using the specimen database at the Royal British Columbia Museum Herbarium. At the Herbarium, specimen data are maintained on a FOXPRO database that has been updated and annotated by specialists to reflect the recent changes in grass taxonomy. Each record in the checklist has an associated specimen housed at the Herbarium, except in the case of some of the Red- and Blue-listed specimens described in Douglas et al. (1998). In most cases, the names follow Douglas et al. (1994). The names of some genera were changed to reflect changes in taxonomic thinking and to reflect the changes that will be included in the Manual of Grasses of North America (to be released in the near future by Barkworth et al.).

The maps were generated using a Geographic Information System (ArcView 3.0a) from the geographic coordinates in the database records. The base map is from the Watershed Atlas data available in digital format from the Ministry of Environment, Lands and Parks website. The base map data were digitized from nts 1:50 000 mapsheets and converted to nad 83 format in 1996. It is in Albers Equal Area Conic projection. The watershed base map was clipped to the study area determined by the Living Landscapes program at the Royal British Columbia Museum. Point data from the database were added to the base map, and a distribution map was generated for each species. The points represent actual specimen locations and can be traced back to the database and a herbarium sheet. Many species that show limited distribution may prove to be more widely distributed as a result of more extensive field work. The maps should be used as a guide to where specimens have been collected but in no way reflect the only places where the species can be observed.

There are four main parts to a grass plant, roots, stem (culm), leaves, and flowerhead (inflorescence). Each part has diagnostic features that help in correct identification. It is often the combination of several characters that eventually leads you to the correct name. The grass descriptions in this guide are designed to point out important features of each of these parts. It is very important to get as much information on each part of the plant to help identify the grasses. In other words, it is best to have the entire plant, roots and all, to identify a grass.

Roots

Grasses grow from fibrous root masses, but sometimes there is a below-ground root-stem structure called a rhizome (Photo 1), which is often mistaken for a root. It is important that you observe whether the specimen has a rhizome or not. Often the root mass may appear to have no rhizome but if you squeeze the mass you can detect a hard, branch-like projection that is the end of a rhizome that got broken when the plant was removed from the soil. Annual grasses do not have a rhizome, they have only a mass of fibrous roots (Photo 2).

PHOTO 1

PHOTO 2

Stems (Culms)

Stems in grasses are actually called culms in grass keys, but we have retained the term "stem" to make it easier for laypeople. Stems sometimes assume varying forms that may at first seem confusing. These forms are very important to grass identification. The single upright stem with a few leaves at the base is the most familiar form, but stems can also originate from clusters (cespitose) or tufts of leaves at the base. Stems can be found below ground (rhizomes) or above ground (stolons), and may trail on the ground. In some species, these trailing culms root at the nodes.

Stems arise from the crown, which is the base of the leafy part of the grass plant. It is from this crown that leaves and stems regenerate after grazing or fire. Some grasses, such as Onion Grass (*Melica bulbosa*) have swollen stem bases that look like bulbs at the crown. At the end of the first season, the dead stem often remains standing, and dried leaves from the previous year also remain around the base. It is important to note the presence of old stems and leaves at the crown. This feature provides a clue to whether the grass is annual (living for one growing season) or a perennial (living for more than one season). Some grasses are biennials (they grow vegetatively the first year, and produce a flowerhead during the second year).

Leaves

PHOTO 3

PHOTO 4

PHOTO 5

PHOTO 6

Leaves arise either from the crown at the base of the stem or from swellings along the stem called nodes (Photo 3). Nodes are often a dark colour, and in some cases, they may be barely noticeable. Some nodes have small hairs on them. The spaces between nodes are called internodes.

Each leaf consists of a sheath, which wraps around the stem, and a free portion, called a blade. The sheath may be open or closed, an important diagnostic feature with some grasses. If it is closed, it appears like the V in a V-neck shirt. If it is open, the edges of the sheath appear to meet or overlap.

The leaf blade often diverts or bends away at right angles from the stem and the sheath. Often a distinct ridge of tissue develops at the bend. From this ridge of tissue (or collar) there arises the ligule (derived from the word tongue because in many species it looks like a little tongue sticking out) (Photo 4). The ligule sticks up from the ridge and is thought to protect the stem from insects. The sheath is an enclosed surface, and insects could easily move from the flat blade down into the sheath, but the ligule forms a small barrier to this. Ligules have two common forms, consisting either of a membrane or a ring of hairs. At the point where the ligule meets the leaf blade there is usually a narrowing or thickening of the leaf known as the collar (Photo 5).

Ligule form is often critical to the identification of a species. The ligule is also a useful structure to observe when identifying a grass without flowers. The auricle (little ear)—another distinctive structure—occurs in many species at the edges of the collar, sometimes even wrapping around the stem. These auricles range from long pointed flaps of tissue to no more than a few hairs. Many species have no auricle at all. Wheat (*Triticum aestivum*) has well-developed and easily seen auricles (Photo 6).

Length and width of the leaf blade are often used in keys to help distinguish species. A good metric ruler with a clear millimetre scale is an invaluable tool to grass identification. In addition, the blade may be flat, "folded lengthwise"(conduplicate), or inrolled (involute). Sometimes the form of the leaf tip is a useful feature. For example, Bluegrasses (*Poa* spp.) have keeled or prow-like tips, like the prow of a canoe. It is important to check several leaf tips because young leaves are the favoured food of many animals, and that strange tip may have been nibbled into shape.

Flowerheads (Inflorescences)

PHOTO 7

PHOTO 8

PHOTO 9

PHOTO 10

At the point where the inflorescence (flowerhead) begins, the stem officially ends and the stem axis above this point is called a rachis (Photo 7). Sometimes there is a noticeable node at this point or branches begin to point either upward or outward. In this treatment the measurements for the length of the flowerhead are taken from this node to the top of the flowerhead. The branching pattern and the general form of the flowerhead is a useful feature for field recognition. The rachis of the flowerhead may be obviously branched or unbranched. The branched (Photo 8) inflorescence in this treatment has spikelets attached to the rachis, and any branching can be clearly observed. Flowerheads that have spikelets attached directly to the rachis are classified as spikes. It is important to note whether you are looking at a fully extended flowerhead because an immature specimen can look spike-like. An example of this can be observed in Photo 7 and Photo 9. They are actually the same species, Yorkshire Fog (*Holcus lanatus*).

The nitty gritty of grass identification gets down to the structural details of the flowering units called spikelets and the flowers within them (Photo 10). Grasses bear their flowers on highly modified side branches called spikelets. At the spikelet base, closest to where the spikelet meets the main branches of the flowerhead, there are two highly modified leaves called glumes (Photo 11). The glumes hold the flower or flowers, which are arranged alternately along the rest of the branch above them. The form of the glumes, their size (length), whether or not they exceed the inner flowers in length, and surface texture are all useful features to observe. A good hand lens, or in some cases a binocular dissecting microscope, is very useful to view these characteristics. In the key we have added an illustration of a magnifying glass to indicate where you will need additional magnification.

Awns are pointed extensions of either the tip, back, or base of the glume (Photo 12). They can be long or short, straight, curved, or even bent. In some species, the glume is also modified such that it is awn-like for its entire length.

The reproductive parts are arranged on the branch above the glumes. For the purpose of this guide we are calling florets "flowers". Flowers can be widely separated along the spikelet, or jammed tightly together (Photo 13). The number of flowers in a spikelet is an important feature to note. Some genera and species have only one flower in each spikelet, whereas others bear 10 or more within the spikelet. Some flowers in the spikelet are sterile (empty). It is important to note whether these sterile flowers are above or below the fertile flowers. Some species have an empty flower at the end of the spikelet and others have a small extension of the branch of the spikelet.

Non-grasses have petals surrounding the flower to attract the attention of pollinators, but grasses are wind-pollinated. Instead they bear small, leaflike bracts or scales to protect the seed until it is mature. The grass seed used to seed a lawn is actually naked, but in nature most seed, when it is dispersed, retains two leaf-like covers. The outside (located away from the stem) and sometimes larger leaf-like part is called the lemma (Photo 14), and the inside (closest to the stem), usually smaller, part is called the palea. The palea may be reduced in size or missing entirely but the lemma is always there. The lemma cuddles or holds the palea and the stamens and pistil inside. Lemma and palea form, size, and hairiness are critical features in grass identification. These parts often absorb water and hold it close to the seed for germination.

One of the most useful features of the lemma is the character of the awns. It is important to note first of all whether an awn is present or not. Its length

PHOTO 11

PHOTO 12

PHOTO 13

PHOTO 14

PHOTO 15

PHOTO 16

is measured from the tip to the point where the awn joins the lemma or glume. Is the awn straight or bent, or, as in the case of California Oatgrass (*Danthonia californica*), twisted several times (Photo 15)? Note whether the awn is attached at the end, middle, or base of the lemma or glume. If you think awns are not important, recall how after running through a meadow or field you had to pull out the spikey bits of grass from your socks or pants. The spikey bits may well have been florets jabbed into your clothing by the awns. Dog owners will be familiar with the various types of awned grasses; some of these can inflict pain and infection to soft body parts. Needle-and-thread Grass (*Stipa* spp.) is a nuisance to cattle owners. Other useful awn features to note are whether it arises at the tip of the lemma, or between a couple of teeth, as in Bromes (*Bromus* spp.). Sometimes the base of the lemma is modified into a structure called a callus. The callus may have no hair, be covered by a short tuft of hairs called a beard, or have long wavy hairs that appear web-like. The web-like callus is particularly important in deciding which Bluegrass (*Poa* spp.) you have. The awn and the callus may actually be very important in orienting the seed and helping to work the seed deeper into the soil. Experiments have shown that some grass seeds show reduced germination if the awn is removed in various soil types. In some soils, awns are necessary for successful germination.

Finally we get to the reproductive heart of the matter, the anthers (pollen part) and the stigma (ovary) within the palea and the lemma of each flower. Sometimes the grass floret may have already ripened and there will be only a hard fruit called the caryopsis. Perhaps the most important feature to note is whether both are present or not. Some species may have several flowers in a spikelet but only one may be fertile—that is, having either anthers or ovary. In some species the flowers are unisexual, having separate sexes in separate flowers. Because of this, the ideal time to collect grasses is when they are in full flower. In most grass species the anthers hang down between the palea and lemma of the spikelet (Photo 16). This is the most colourful time in the flowering of the grass: most anthers are yellow or rust coloured.

All three groups of the grass-like plants (grasses, sedges, rushes) are monocotyledons—plants that have one seed leaf. All three groups produce mostly narrow leaves with parallel veins. The flowers are relatively obscure and difficult to work with at first glance.

To decide whether a plant is a grass, sedge, or rush, begin by looking at the stem. Observe first whether the stem is hollow or solid. Generally, if the stem is hollow you have a grass. There are very few grasses that have solid stems. To be certain that the stem is hollow, cut it open between the nodes (Figure 2a). If the specimen has a solid stem, it is likely not a grass. Peel back the leaves, if there are any, and note whether the stem is round (i.e., if it easily rolls between your fingers) or whether it is angular. Plants with angular stems are usually sedges; those with round stems are rushes. Hence the simple maxim is "rushes are round and sedges have edges" (Figure 2b).

Technically speaking, the Sedge family (Cyperaceae) has many genera, not all of which have angular stems. The "sedges have edges" character applies mostly to true sedges in the genus *Carex*. Many bulrushes or tules in the genus *Scirpus* have round stems. To be certain that a plant is a member of the Sedge family you must examine the flower. The individual flowers are borne in the axil (inside face) of a single scale-like bract. This contrasts with grasses, which have two bracts immediately associated with the individual flower (lemma and palea). Sedges and grasses have one seed for each flower, in contrast to the rushes, which have a three-part capsule filled with many small, black seeds.

Rushes (*Juncus*) and wood rushes (*Luzula*) in the Rush family (Juncaceae) have solid stems as mentioned. The flowers usually consist of two series of three petal-like structures, which surround the pistil (Figure 2c). Using a hand lens you can see that these look like the petals of a miniature brownish lily.

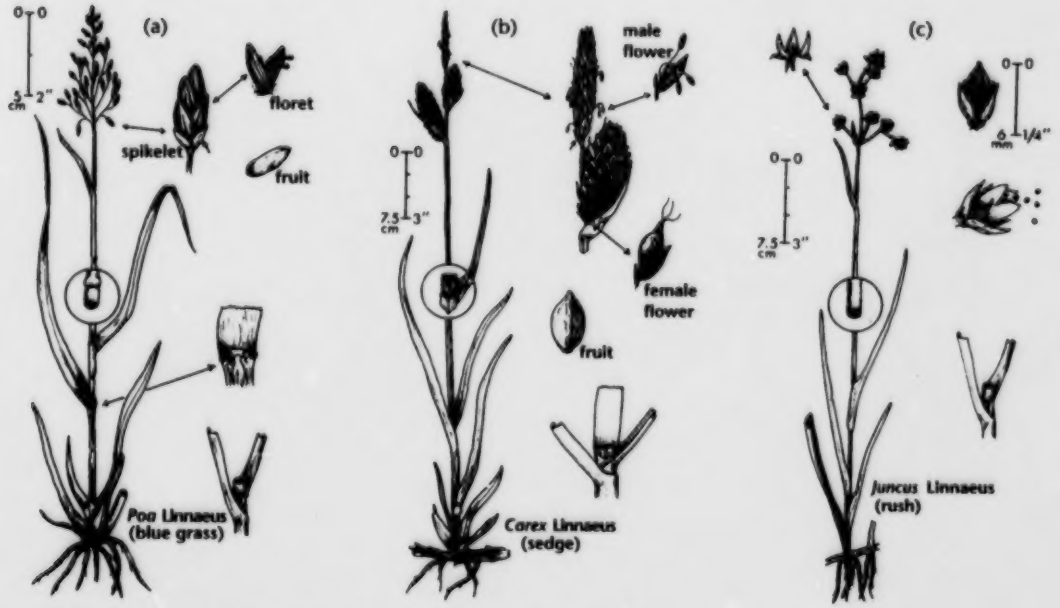


FIGURE 2 *Illustrations of (a) grass, (b) sedge and (c) rush anatomy.*

Adapted from Douglas et al. 1994 and Pojar and MacKinnon 1994

Agropyron fragile

Flowerhead a spike (no branches or very short branches) ..... Group 1

Bromus vulgaris

Flowerhead with branches (either open and spread, or pressed close to the flowerhead axis) ..... Group 2

Agrostis scabra

Each spikelet with one fertile flower (may have additional sterile flowers) 2a

Poa arctica

Each spikelet has two to many flowers ..... Group 3

Poa alpina

Glumes shorter than the first flower 3a

Danthonia intermedia

Glumes as long as or longer than the first flower 3b

Group 1 (Flowerhead a spike or several spikes)

Spike or spikes cylindrical and bristly or feathery

1a. Flowerhead consists of several spikes 2
  2a. Spikes not branching, but with spikelets on one side of the axis 3
    3a. Spikelet with one perfect flower and several modified flowers... ..... *Bouteloua*
    3b. Spikelets without modified flowers ..... *Spartina*
  2b. Several branching spikes with spikelets along the branches 4
    4a. Spikelets awnless ..... *Digitaria*
    4b. Spikelets with long, bent awns ..... *Schizachyrium*
1b. One spike with spikelets around the axis (not only on one side) 5
  5a. Annual 6
    6a. Spikelets of two types that look different from each other (one sterile, one fertile) ..... *Cynosurus*
    6b. All spikelets similar at each node 7
      7a. Bristles below the flowers ..... *Setaria*
      7b. Awns, not bristles, on the lemmas or glumes 8
        8a. Spikelet one-flowered ..... *Polypogon*
        8b. Spikelets multiflowered 9
          9a. Two spikelets at each node; glumes keeled .... *Triticum*
          9b. One spikelet at each node; glumes rounded across the back ..... *Secale*
  5b. Perennial 10
    10a. Spikelets easily observed as two or more at each node 11
      11a. Spikelets three at each node (two sterile, one fertile)... ..... *Hordeum*
      11b. Two or more fertile spikelets at each node ..... *Elymus*
    10b. Flowerhead large and feathery with spikelets obscured by extremely long, silky hairs ..... *Phragmites*

Spike cylindrical and not bristly

1a. Annual; two spikelets at each node; glumes keeled ..... *Triticum*
1b. Perennial 2
  2a. Each spikelet with one flower 3
    3a. Glumes noticeably broad, round, not hairy on the glume keel ..... *Beckmannia*
    3b. Glumes broad with keel fringed with hairs 4
      4a. Glumes tipped with stiff awns; as well as on the keel with fringe of hairs ..... *Phleum*
      4b. Glumes without stiff awn, but lemma with bent awn... ..... *Alopecurus*
  2b. Each spikelet with several flowers 5
    5a. Glumes as long as or slightly shorter than the first flower.... *Koeleria*
    5b. Glumes shorter than the first flower 6
      6a. Plants tufted ..... *Elymus*
      6b. Plants with rhizomes, leaf blades prominently ribbed .... *Leymus*

Spike not cylindrical, but appears as a series of flattened spikelets along the axis

1a. Several spikelets per node 2
2a. Flowerheads consist of all male spikelets or all female spikelets; small branches may be observed ..... *Distichlis*
2b. Flowerheads consist of sterile flowers, anthers do not open... ..... x *Elymordeum*
1b. One spikelet per node..... 3
3a. Spikelet with narrow side facing the axis ..... *Lolium*
3b. Spikelet with broad side against the axis 4
4a. Spikelet length more than three times spike internode length..... ..... *Agropyron*
4b. Spikelet length one to three times the length of the internode.... 5
5a. Glumes lance-shaped with a sharp point, stiff and shorter than the spikelets but longer than 5 mm..... *Pascopyrum*
5b. Glumes oval-shaped, or blunt lance-shaped but shorter than 5 mm..... 6
6a. Glumes stiff, brittle, and blunt..... *Thinopyrum*
6b. Glumes flexible, acute to awned 7
7a. Spikelets spread out along the axis, scarcely reaching the base of the spikelet above..... *Pseudoroegneria*
7b. Spikelets closely spaced, usually reaching midpoint of the spikelet immediately..... *Elymus*

Group 2 (Flowerhead branched; branches may be open or pressed against the flowerhead axis)

Each spikelet with one flower

1a. Lemma hard or like a thick membrane (hard as a fingernail) 2
2a. Awns split into three branches..... *Aristida*
2b. Awns unbranched..... 3
3a. Callus sharp and 1–6 mm long; greater than 1/5 the length of the flower; awns 4–30 cm long..... *Stipa (Hesperostipa)*
3b. Callus shorter, not as sharp; less than 1/5 the length of the flower..... 4
4a. Stem leaves less than 1 cm long; basal leaf blades green over winter..... *Oryzopsis*
4b. Stem leaves longer than 1 cm; basal leaves drying over winter... 5
5a. Flowers are compressed; callus 0.1–0.6 mm long, rounded ..... *Piptatherum*
5b. Flowers rounded to slightly compressed; callus 0.2–2 mm long, pointed but not sharp..... *Stipa (Achnatherum)*
1b. Lemmas membrane-like (not hard)..... 6
6a. Glumes equalling or longer than the first flower..... 7
7a. Glumes unequal in length; lemmas one- to three-nerved, awnless..... *Sporobolus*
7b. Glumes nearly equal; lemmas three- to five-nerved 8
8a. Lemmas awned..... 9
9a. Awn arising from a minutely cleft tip ..... *Muhlenbergia*

9b. *Awn arising from the back or just below the tip, awn 5.5 mm long* ..... *Apera*

8b. Lemmas unawned or minutely awned ..... *Cinna*

10a. Callus obviously bearded ..... *Calamagrostis*

10b. Callus of flower minutely bearded or not at all .... *Agrostis*

6b. Glumes shorter than the first flower 11

11a. Glumes sharply pointed and callus bearded ..... *Calamovilfa*

11b. Glumes blunt or rounded 12

12a. Glumes less than 1/2 the length of the first lemma 13

13a. Lemma nerves parallel, not converging toward the blunt tip ..... *Catabrosa*

13b. Lemma nerves converging toward a rounded or slightly pointed tip ..... *Panicum*

12b. Glumes almost as long as the first flower, but very dissimilar in shape; lemma nerves not parallel ..... *Sphenopholis*

Group 3 (Flowerhead branched; each spikelet with two to many flowers)

Glumes shorter than the first flower

1a. Callus of the flower bearded 2

2a. Lemmas awnless 3

3a. Spikelets less than 10 mm long ..... *Poa*

3b. Spikelets greater than 10 mm long ..... *Scolochloa*

2b. Lemmas awned ..... *Schizachne*

1b. Callus of the flowers not bearded 4

4a. Lemmas keeled 5

5a. Spikelets strongly compressed, crowded in dense, one-sided flowerhead ..... *Dactylis*

5b. Spikelets compressed but not as above; lemmas unawned or awned from a cleft tip ..... *Bromus*

4b. Lemmas rounded on the back and spikelets not strongly compressed 6

6a. Glumes papery; stems may be bulb-like at the base ..... *Melica*

6b. Glumes not papery 7

7a. Nerves of the lemma parallel; not meeting at the tip 8

8a. Lemma nerves barely visible, usually five ..... *Puccinellia*

8b. Lemma nerves prominently ridged, usually five to seven 9

9a. Leaf sheaths open, their edges free and overlapping ..... *Torreyochloa*

9b. Leaf sheaths (upper ones) closed for entire length ..... *Glyceria*

7b. Nerves of the lemma converging or meeting at the tip 10

10a. Lemmas sharply pointed and awn-tipped; leaf sheaths open 11

11a. Plants annual ..... *Vulpia*

11b. Plants perennial ..... *Fescue*

10b. Lemmas not so sharply pointed and, if awned, from a cleft in the tip 12

12a. Spikelets greater than 15 mm long; lemmas, if awned, from a cleft tip ..... *Bromus*

12b. Spikelets less than 15 mm long, lemmas awnless. . . .. *Poa*

Group 4 (Flowerhead branched; each spikelet with two to many flowers)

Glumes equal to or longer than the first flower

1a. Lemmas awnless 2

2a. Flowerhead with a distinct pyramid shape and few spikelets, mostly at the ends of long branches ..... *Hierochloe*

2b. Flowerhead with branches densely covered with spikelets right to the base of the branch ..... *Phalaris*

1b. Lemmas awned 3

3a. Lemmas awned from the tip 4

4a. Lemma awns arising from between two lobes at the tip. . . .. *Danthonia*

4b. Lemma awns arising from a narrow pointed tip ..... *Vulpia*

3b. Lemmas awned from the back rather than from the tip 5

5a. Spikelets large; glumes 8–30 mm long ..... *Avena*

5b. Spikelets small; glumes 2–9 mm long 6

6a. Lemma awns attached above the middle closer to the tip. . . .. *Trisetum*

6b. Lemma awns attached below the middle 7

7a. Plants delicate annual; spikelet axis not extended beyond the upper flower ..... *Aira*

7b. Plants perennial; spikelet axis extended beyond the upper flower as a small projection 8

8a. Leaf blades flat; spikelets purplish ..... *Vahlodea*

8b. Leaf blades folded or inrolled; spikelets greenish or tawny ..... *Deschampsia*

The name *Agropyron* comes from the Greek word for wild wheat, and *Agropyron* species have a wheat-like appearance. There has been some controversy concerning the species included in this genus. Hitchcock et al. (1969) recognized nine species of *Agropyron*. Today there is general agreement that *Agropyron* should be restricted to the "crested wheatgrasses." These species are perennial plants with a stem axis that does not come apart at maturity, a flowerhead that is a spike, spikelets that diverge from the stem axis at an angle of 30° or more, and one spikelet at each node. The species that were traditionally contained within *Agropyron* are now treated in *Elymus*, *Thinopyrum*, *Pascopyrum*, and *Pseudoroegneria*. There are three British Columbia species remaining in the genus *Agropyron*, and these are Crested Wheatgrass, Desert Wheatgrass, and Siberian Wheatgrass. In the Columbia Basin region, only Crested Wheatgrass and Siberian Wheatgrass have been collected.

***Agropyron*—Adapted from Douglas et al. (1994)**

1a. Spikelet spread from the stem axis 30° or more; the distance between the spikelets is less than 1 mm ..... *Agropyron cristatum*

1b. Spikelet pressed to the stem axis; the distance between the spikelets is greater than 1 mm ..... *Agropyron fragile*

Agropyron cristatum (L.) Gaertn. ssp. ***pectinatum*** (Bieb.) Tzvelev
Crested Wheatgrass

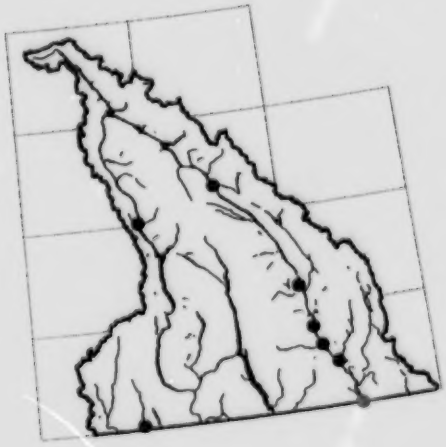
Plant: *Agropyron cristatum* is an introduced species that grows 50–100 cm tall. It is a tufted perennial with densely fibrous roots, but no rhizome. The flowerhead is composed of a flattened spike containing spikelets that resemble the teeth in a comb—thus the subspecies name *pectinatum* is from pectinate, meaning comb-like.

Leaves and Stem: The lower leaf sheaths are most often hairless, but may be occasionally soft-hairy. The slender, claw-like auricles are 1 mm long, and the hairy ligules are less than 1 mm long. Flat leaf blades are 2–5 mm, and are usually hairy on the upper surface.

Flowerhead and Flowers: The spikes are 2–6 cm long, and have spikelets that diverge from the hairy stem axis like the teeth of a comb. The spikelets overlap and spread out rather than press close to the axis. The longest glume is about the length of the first flower and the other glume is shorter. The awns of the glumes and the lemmas are 2–4 mm long, and the awns of the lemmas are slightly bent.

Habitat: Crested Wheatgrass was introduced from Russia for forage purposes and has been extensively used to revegetate rangeland. It occurs along roadsides, in fields, and on disturbed sites. In the Columbia Basin region it grows in sites from Tobacco Plains at the Canada/U.S. border, to as far north as Revelstoke.

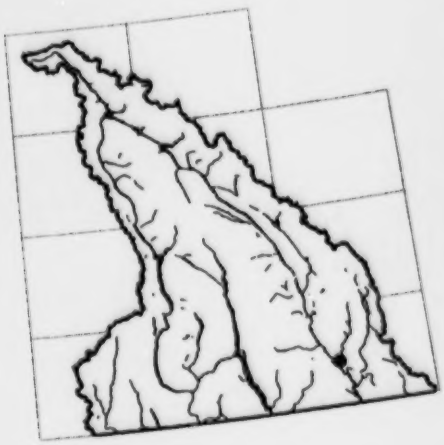
Similar Species: In British Columbia, the three species in the genus *Agropyron* hybridize, so it is often difficult to tell them apart. In the Columbia Basin region, Desert Wheatgrass has not yet been collected. Douglas et al. (1994) distinguish Crested Wheatgrass on the basis of the spreading angle of the spikelet from the stem axis. Greater than 30° indicates *Agropyron cristatum* ssp. *pectinatum*.



Agropyron fragile (Roth) P. Candargy
Agropyron sibiricum (Wild.) Beauv.
Siberian Wheatgrass

Plant: *Agropyron fragile* is an introduced species that grows to 70 cm tall. This perennial is tufted. The flowerhead is a comb-like spike that has shorter "teeth" and therefore appears less comb-like than *A. cristatum* ssp. *pectinatum*.
Leaves and Stem: The lower leaf sheaths are most often hairless but may be occasionally soft-hairy. The scarcely visible ligules are less than 0.5 mm high, consisting of a zone of hairs. The flat leaves are 4–5 mm wide.
Flowerhead and Flowers: The spike flowerhead is 3–7 cm long. Spikelets diverge from the stem axis at less than 30°. This arrangement gives the spikelets the appearance of being pressed tightly to the stem axis. The glumes are 4–5 mm long, with 1.5 mm long awns. The lemmas are awnless or short-awned. The first glume is slightly longer than the second and about equal to the first flower.

Habitat: Siberian Wheatgrass was introduced from south-central Russia and grows along roadsides, in fields, and on wasteplaces. It occurs only at Wardner in the Columbia Basin region.
Similar Species: Siberian Wheatgrass has awnless lemmas; however, this species interbreeds and hybridizes with Crested Wheatgrass, so it may be difficult to distinguish between these two species. The flowerhead of Crested Wheatgrass has longer spikelets and therefore appears more comb-like than Siberian Wheatgrass. Crested Wheatgrass has a wider spike than Siberian Wheatgrass: 8–10 mm, compared to 5–6 mm.



The name of the genus *Agrostis* derives from a Greek word for grass and is the basis of the name for the study of grasses called Agrostology. Bentgrasses are common meadow, pasture, and lawn grasses because they are included in seed mixtures. There are also several native species. The Columbia Basin region has at least seven species of *Agrostis* growing in it. Typical features include very small one-flowered spikelets that separate from the stem above the glumes at maturity. The lemmas are equal to, or much smaller than, the glumes. The sheaths are open and the ligules are membrane-like. Leaves vary from flat to folded and inrolled. The flowerhead is branched and relatively open to fully open, not spike-like (except in *Agrostis exarata*). The branches of the flowerhead do not droop. In *Agrostis* there are no obvious stiff hairs at the base of the lemma, whereas in the closely related *Calamagrostis* (Reedgrass) there are.

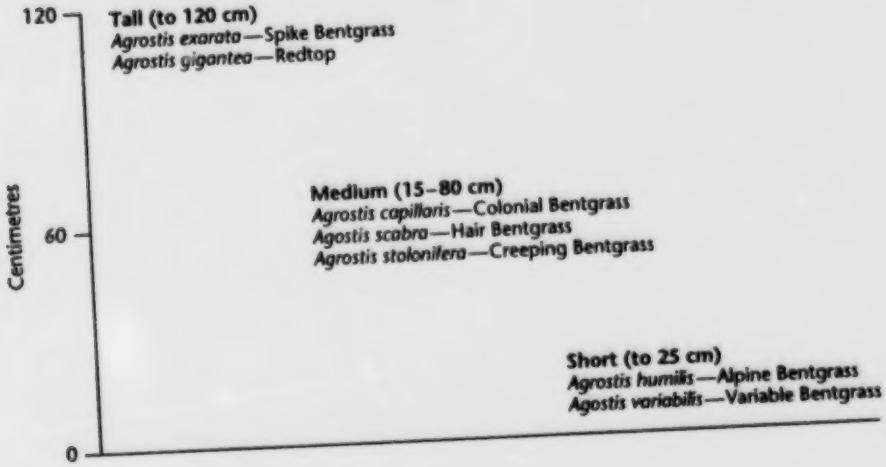
Two groups of *Agrostis* occur in the Columbia Basin region. One group has stolons (above-ground horizontal stems) or rhizomes (below-ground or at-ground root-stems) and includes only introduced species including *Agrostis capillaris, A. gigantea,* and *A. stolonifera.* The second group generally lacks stolons or rhizomes. If rhizomes or stolons are present, they are less than 2 cm long.

To identify native species you will need a hand lens or dissecting microscope because many of the distinguishing features are small. For example, to identify whether you have *Agrostis humilis* or *A. variabilis* you must determine whether or not there is a palea. *A. variabilis* has either a rudimentary palea or no palea at all.

Agrostis—Adapted from Douglas et al. (1994)

1a. Rhizomes or stolons absent 2
  2a. Flowerhead open with branches spreading; has very few spikelets on lower 1/2 of the branches; palea absent or less than 1/4 as long as lemma . . . . . *Agrostis scabra*
  2b. Flowerhead constricted or with branches pressed close to the axis; branches may be barely visible 3
    3a. Palea present, 1/2 as long as lemma. Plants of subalpine and alpine zones . . . . . *Agrostis humilis*
    3b. Palea absent; if present, a minute membrane 4
      4a. Lemmas awnless . . . . . *Agrostis variabilis*
      4b. Lemmas awned from the back . . . . . *Agrostis exarata*
1b. Rhizomes or stolons present; flowerhead open with branches spreading; very few spikelets on lower 1/2 of the branches. Palea present, 1/2 as long as lemma 5
  5a. Stolons present, no rhizomes . . . . . *Agrostis stolonifera*
  5b. Stolons absent, rhizomes present 6
    6a. Ligules 2–6 mm; rhizomes abundant and long . . . *Agrostis gigantea*
    6b. Ligules up to 2 mm . . . . . *Agrostis capillaris*

Heights of *Agrostis* species



***Agrostis capillaris* L.**
Colonial Bentgrass

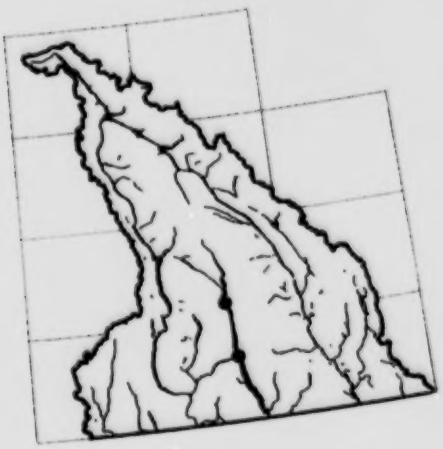
Plant: *Agrostis capillaris* is an introduced species that grows 20–50 cm tall. It has a short rhizome and is a perennial with a broad, open flowerhead with tiny spikelets.

Leaves and Stem: A few short rhizomes can occur within the root mass. The stems are slender with open sheaths. The flat to folded leaves are 2–5 mm wide. Most ligules are 1–2 mm long, more or less of even height, and wider than they are long. There are no auricles.

Flowerhead and Flowers: The flowerhead is 5–15 cm long, sparse, and very open. The branches are delicate and bear spikelets only toward the ends. The one-flowered spikelets are usually purple. The two almost equal, pointed glumes are relatively large, and as long or longer than the first flower. The lemma is shorter than the glumes and is either awnless or has a short awn. The palea is 1/2 to 2/3 as long as the lemma.

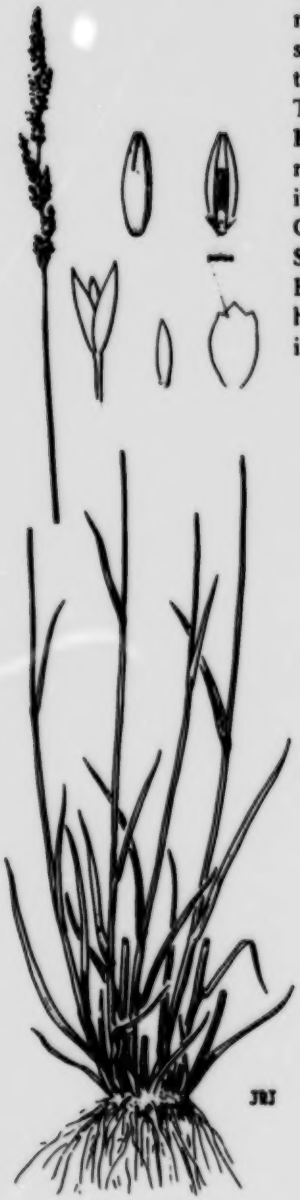
Habitat: Colonial Bentgrass grows in lawns, fields, roadsides, meadows, and moist open sites. It is a common component of lawn, turf, and pasture seed mixes.

Similar Species: Creeping Bentgrass (*Agrostis stolonifera*), another grass used in seed mixtures, has no rhizomes but has stolons. Its ligules are longer (3–6 mm) than those of Colonial Bentgrass. Creeping Bentgrass occurs in moister habitats (ditches, pond edges, moist fields and meadows) than does Colonial Bentgrass.



Agrostis exarata Trin.
Spike Bentgrass

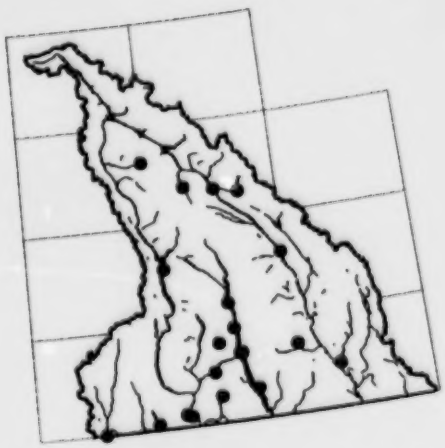
Plant: *Agrostis exarata* is a native species that grows to 1.2 m, but is usually shorter. It is a tuft-forming perennial with a spike-like flowerhead and mostly erect stems that may root at the lowest nodes.
Leaves and Stem: Sheaths are open. Leaf blades are flat, rough, and 2–10 mm wide. Ligules are 3–8 mm high and somewhat torn at the tip. There are no auricles.
Flowerhead and Flowers: The flowerhead is 5–18 cm long, narrow, spiky, and somewhat open. The axis may be exposed between the clusters of branches. The tiny spikelets are generally clustered toward the base of the side branches. The small, nearly equal glumes are rough on the back and much longer than the first flower. They usually come to a point or have a small awn. There is a single lemma, which may or may not have an awn. If there is an awn, it is attached above the midpoint and may reach 5 mm long. The palea is less than 1/3 the length of the lemma.
Habitat: Spike Bentgrass grows at low to mid elevations in moist sites such as rocky beaches, river bars, and moist meadows. In the Columbia Basin region it has been collected from Pilot Bay Provincial Park, Nelson, and Kokanee Glacier Park.
Similar Species: Mountain Bentgrass (*Agrostis variabilis*) is similar to Spike Bentgrass, but it is much smaller and has a tight, but not spike-like, flowerhead that grows to 2–6 cm long. Its leaves are narrow and it grows generally in alpine and subalpine environments.



Agrostis gigantea Roth
Redtop

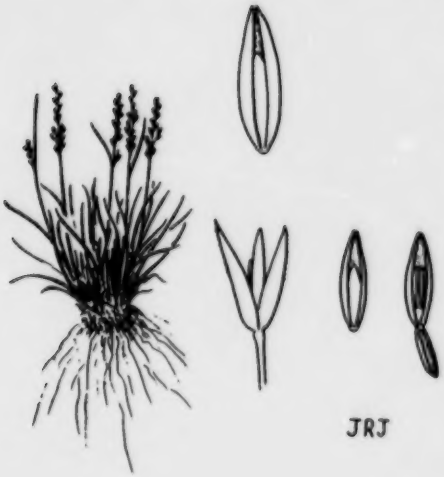
Plant: *Agrostis gigantea* is an introduced species that grows to 1.2 m tall. It is a perennial with numerous rhizomes. The open-branched flowerheads are densely covered in spikelets to the base.
Leaves and Stem: One to two stalks arise from the nodes of rhizomes that are 10 cm+ long. Sheaths are open. Leaf blades are flat to folded and rarely >4 mm wide. Ligules are 2–6 mm high. There are no auricles.
Flowerhead and Flowers: The flowerheads are purplish, up to 30 cm long, branched, somewhat narrow, and densely covered by one-flowered spikelets. Glumes are almost of equal size and longer than the flower. The lemma is 1/2–2/3 the length of the glumes and is awnless. The palea is 0.7–1.4 mm long (1/2 the size of the lemma).

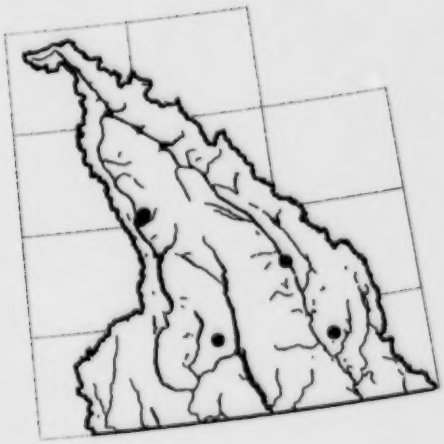
Habitat: Redtop grows in dry, disturbed sites, fields, and roadsides. A large number of specimens have been collected throughout the Columbia Basin region.
Similar Species: Redtop differs from Colonial Bentgrass by having ligules that are longer than they are wide. Redtop differs from Creeping Bentgrass by having rhizomes, and an open flowerhead.



Agrostis humilis Vasey
Agrostis thurberiana auct. non A.S. Hitchc.
Alpine Bentgrass

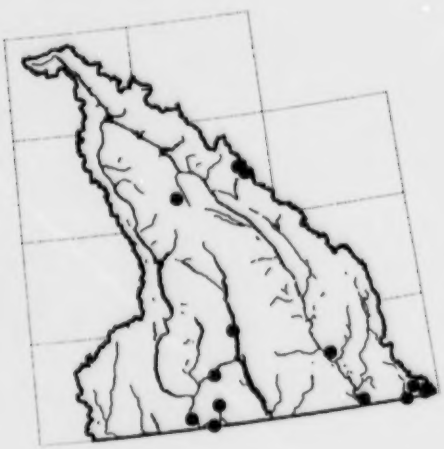
Plant: *Agrostis humilis* is a native species that grows to 15 cm tall. It is a tuft-forming perennial with a small, narrow flowerhead.
Leaves and Stem: Sheaths are open and there are no auricles. The short, extremely narrow (1 mm) leaves form a tuft at the base. Leaves are flat to folded and smooth. The ligule is 0.5–1 mm long and somewhat toothed.
Flowerhead and Flowers: The flowerhead is deep purple, and usually 0.5 cm wide and 1.5–2.5 cm long. There are two more or less equal glumes that are 2 mm long and enclose a single lemma of about the same length. The palea is 1–1.5 mm long.
Habitat: Alpine Bentgrass grows in subalpine to alpine meadows and streambanks. It can be found at Kokanee Glacier Provincial Park and Mount Revelstoke National Park in the Columbia Basin region.
Similar Species: Alpine Bentgrass is similar to Mountain Bentgrass (*Agrostis variabilis*), except that Moutain Bentgrass has no palea.





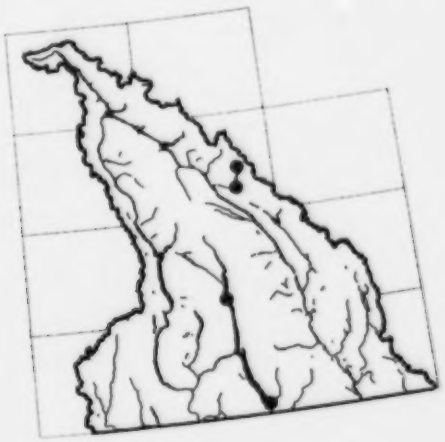
Agrostis scabra Willd.
Hair Bentgrass

Plant: *Agrostis scabra* is a native species that grows 20–70 cm tall. It is a clump-forming perennial with rough-feeling stems and open-branched drooping flowerheads. *Scabra* means rough in Latin.
Leaves and Stem: The numerous, very fine, short leaves grow mostly at the base. Occasionally, short rhizomes or stolons occur. Sheaths are open. Leaf blades are mostly folded and 1–3 mm wide. Ligules are 2–3 mm long and there are no auricles.
Flowerhead and Flowers: The flowerhead is purple, open, 15–30 cm long, and has rough upward-reaching to drooping branches. The branches, however, are not densely packed at maturity. Single-flowered spikelets occur mostly at the branch tips. The glumes are 2–3 mm long, more or less equal in length, and much longer than the flower. Lemmas are 1–2 mm long, and may or may not have an awn. If present, the awn is 2 mm long and attached to the middle of the outside. There is no palea.
Habitat: Hair Bentgrass grows on dry to moist, disturbed sites such as clearings and roadsides. It also invades dry, rocky slopes and gravel bars. In the Columbia Basin region, Hair Bentgrass occurs in Glacier National Park, Yoho National Park, the Flathead area, and Trail.
Similar Species: Hair Bentgrass has a very open, diffuse flowerhead with branches that sometimes are rather lax, and there is no palea. Within the *Agrostis* genus, Hair Bentgrass looks distinctive, but it can have a superficial resemblance to other genera with an open, diffuse flowerhead, such as Silver Hairgrass (*Aira caryophyllea*).



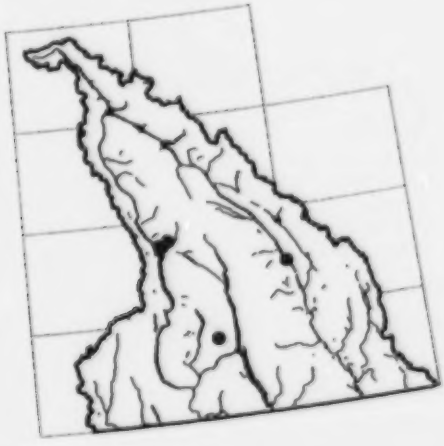
Agrostis stolonifera L.
Creeping Bentgrass

Plant: *Agrostis stolonifera* is an introduced species that grows to 60 cm tall. It is a perennial with stolons, and a large, open but narrowed flowerhead.
Leaves and Stem: The lower part of the stem reclines against the soil and roots at the nodes (stolon-forming). Sheaths are open. Flat to folded leaf blades are more than 4 mm wide. Ligules reach 3–6 mm. There are no auricles.
Flowerhead and Flowers: The flowerhead is openly branched, but somewhat narrowed compared to Colonial Bentgrass. One-flowered spikelets are borne to the base of the branches. The small glumes are nearly equal and longer than the first flower. The tiny lemma is 2/3 to 3/4 the length of the glume. There is usually no awn. The palea is 1/2 to almost equal to the lemma.
Habitat: Creeping Bentgrass grows in moist lawns and fields, along ditches, and at the margins of salt marshes, ponds, and lakes. In the Columbia Basin region, Creeping Bentgrass occurs at Emerald Lake, Lardeau, and Creston.
Similar Species: See Colonial Bentgrass (*Agrostis capillaris*) and Redtop (*Agrostis gigantea*).



Agrostis variabilis Rydb.
Mountain Bentgrass

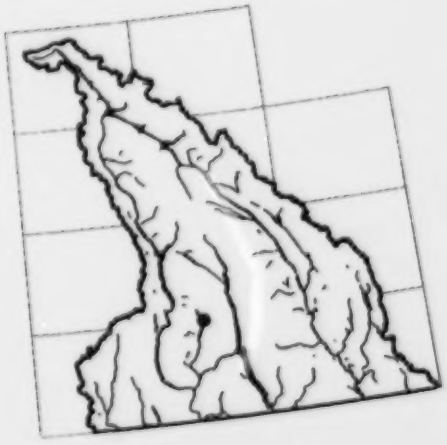
Plant: *Agrostis variabilis* is an introduced species that grows to 25 cm tall. It is a tuft-forming perennial with a small, spike-like flowerhead and erect stems.
Leaves and Stem: Stems arise from dense masses of basal leaves. Sheaths are smooth and open. There are no auricles. The flat to folded leaves are from 1.0–2.5 cm wide, and range from smooth to rough. Ligules are 0.5–2.5 mm long, and have a torn to slightly hairy margin.
Flowerhead and Flowers: The narrow, dense, purple flowerhead is 3–6 cm long and up to 1 cm wide. Spikelets have small, nearly equal glumes that are mostly smooth on the back. The usually unawned lemma is slightly shorter to much shorter than the glumes. The palea is 0.2–0.4 mm long, so it is considered as "none."
Habitat: Mountain Bentgrass grows in subalpine to alpine meadows and on open ridges. This species is known from Lake Windermere, Kokanee Park, and Hamilin Lake in the Columbia Basin region.
Similar Species: There are two species similar to Mountain Bentgrass. They are Alpine Bentgrass and Spike Bentgrass. The difference is that Mountain Bentgrass has no palea, whereas the other two do. Another distinguishing character is that the glumes of Mountain Bentgrass are mostly smooth.



Hairgrasses originated from Europe, where there are nine species. They are generally delicate annuals with extremely fine leaves. They have little forage value and are not considered troublesome. In British Columbia there are two species, *Aira caryophyllea* and *A. praecox*. Only *A. caryophyllea* has been collected in the Columbia Basin region.

Aira caryophyllea L.
Silver Hairgrass

Plant: *Aira caryophyllea* is an introduced species that grows 5–30 cm tall. It is a tufted annual with an open, widely branched flowerhead.
Leaves and Stem: The sheaths are open and the leaf blades are extremely narrow (0.3–0.7 mm), occurring mostly at the base of the stem. The ligule is 1.5–3.5 mm long, slightly hairy, and tattered at the tip. There are no auricles.
Flowerhead and Flowers: The broad and diffuse flowerhead is 2–6 cm long, with tiny, shiny, silvery spikelets at the ends of the thin branches. The two glumes are equal, 3 mm long, and enclose two flowers. The lemmas are 2–2.5 mm long and bear bent, twisted awns that are 2.5–3.5 mm long and attached below the midpoint.
Habitat: Silver Hairgrass grows in dry, open, rocky sites and sometimes invades rock gardens. In the Columbia Basin region it grows at Hamilin Lake.
Similar Species: Early Hairgrass (*Aira praecox*) is very similar to Silver Hairgrass, but has not been collected in the Columbia Basin region. The two are easily distinguished by the different flowerheads. The flowerhead on Silver Hairgrass is open and widely branched, compared to the tightly closed flowerhead of Early Hairgrass. In addition, Silver Hairgrass has shorter lemmas than Early Hairgrass. Annual Bluegrass (*Poa annua*) is another small-tufted annual grass similar to Silver Hairgrass, but Silver Hairgrass does not have folded leaves and does not root at the nodes like Annual Bluegrass.



The common name Foxtail aptly describes the shape of the flowerhead of this genus. The species that make up *Alopecurus* have a dense, cylinder-like spike for a flowerhead. This genus has an appearance similar to *Phleum pratense*, a common pasture grass introduced from Europe. The *Alopecurus* species have blunt-tipped glumes with soft hairs along the keel, and the lemma has a short awn. The glume of *Phleum pratense* has a stiff bristle, but the lemmas are awnless. *Alopecurus* species are often found growing partially submerged in wet sites. The species generally provide good forage but are rarely abundant.

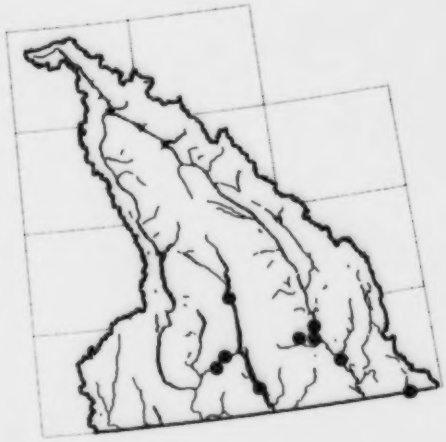
***Alopecurus*—Adapted from Douglas et al. (1994)**

1a. Straight awn arising from near middle of the lemma; extending less than 1.5 mm longer than the glumes..... *Alopecurus aequalis*

1b. Bent awn arising from lower third of the lemma; extending more than 1.5 mm beyond the glumes..... *Alopecurus geniculatus*

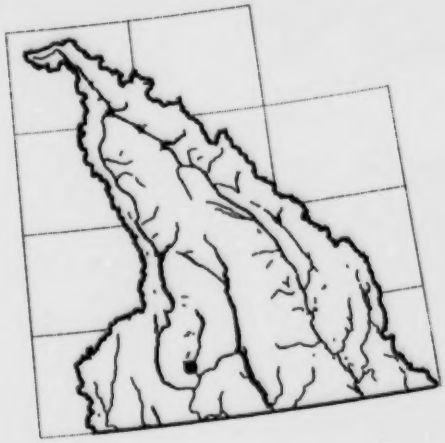
Alopecurus aequalis Sobol.
Little Meadow-foxtail

Plant: *Alopecurus aequalis* is a native species that grows 20–70 cm tall. It is a tufted perennial with a dense, cylinder-like spike. There is a single flower in each spikelet.
Leaves and Stem: The sheaths are open and there are no auricles. The ligules are 4–8 mm high and are membrane-like, pointed, and either ragged or smooth along the edge. The flat leaf blades are 2–5 mm wide and sometimes drooping. The upper surface of the leaves feels rough.
Flowerhead and Flowers: The flowerhead is a pale green, dense spike, varying between 1.5 and 7 cm long. The glumes are 1.8–2.5 mm long with blunt tips and long soft hairs on the back and along the nerves. The lemma is shorter than the glumes, and usually only the lemma awn is visible slightly above the glumes. The straight awn is attached at or below the midpoint of the lemma.
Habitat: Little Meadow-foxtail grows along wet lakeshores, ditches, and streambanks from the lowland to subalpine elevations. In the Columbia Basin region, Little Meadow-foxtail is widespread and has been collected from Kootenay Landing, Nelson, Kokanee Creek Park, Lardeau, Wasa, and the Flathead River.
Similar Species: Little Meadow-foxtail resembles Water Meadow-foxtail (*Alopecurus geniculatus*) in general appearance, but if you look closely you will notice that Water Meadow-foxtail has a bent awn. This feature is obvious when the glumes are removed. The lemma awn of Water Meadow-foxtail is almost twice as long as the lemma.



***Alopecurus geniculatus* L.**
Water Meadow-foxtail

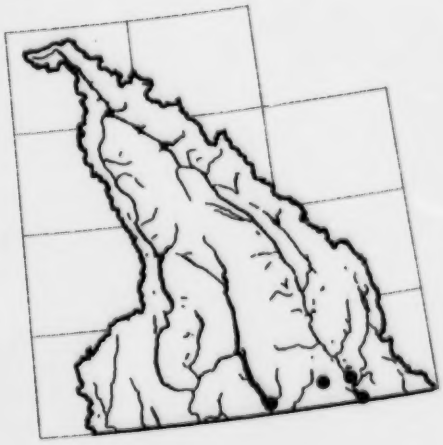
Plant: *Alopecurus geniculatus* is an introduced species that grows 30–50 cm tall. It is a tufted perennial with a dense cylinder-shaped spike.
Leaves and Stem: The sheath is open and there are no auricles. The ligules extend 3–5 mm high and are pointed or blunt with smooth or ragged edges. The flat leaf blades are rough on the upper surface, and are 2–6 mm wide.
Flowerhead and Flowers: The pale green to purplish flowerhead is 2–7 cm long and cylinder-shaped. The glumes have long hairs on the keel and more or less silky hairs across the back. The blunt glume tips appear transparent at the edges. The lemma is shorter than the glumes, and the bent awns are attached 0.5 mm above the lemma base but extend well beyond the glumes.
Habitat: Water Meadow-foxtail was introduced from Eurasia and grows along wet shorelines and ditches from the lowland to montane zones. In the Columbia Basin region, Water Meadow-foxtail has been collected only along the Slocan River.
Similar Species: The flowerhead of Water Meadow-foxtail appears fuzzier than that of Little Meadow-foxtail because of its longer awns.



Apera is a small genus with only three species world-wide, and is native to Europe and Asia. In British Columbia there is only one species, *Apera interrupta*, and this was formerly included in the genus *Agrostis*. Firm lemmas, a long awn originating below the end of the lemma, and a well-developed palea are the distinguishing features of *Apera*. The name comes from the Greek *a* = not, and *peros* = maimed, possibly referring to the long awn.

Apera interrupta (L.) Beauv.
Agrostis interrupta L. L. Dense
Silky Bentgrass

Plant: *Apera interrupta* is an introduced species that grows 10–40 cm tall. It is a tufted to single-stemmed annual with a narrow, softly hairy flowerhead. The branches are pressed close to the stem axis, and the spikelets are spaced along the stem axis so that the flowerhead appears interrupted.
Leaves and Stem: The sheaths are open and there are no auricles. The ligules are 2–5 mm high, blunt, but very ragged along the upper edge. The flat or folded leaf blades are 1–3 mm wide.
Flowerhead and Flowers: The 5- to 10-cm-long flowerhead is narrow—almost resembling a spike—but the branches are pressed close to the stem axis. The first glume is 1/4 the length of the second glume. The second glume is longer than the flower. The 2-mm-long lemma has an awn that is attached below the tip and is 6–7 mm long. The flowerhead appears soft and silky because of the lemma awn.
Habitat: Dense Silky Bentgrass grows in dry, disturbed sites and, although introduced from Europe, it has spread widely in dry waste areas. In the Columbia Basin region Dense Silky Bentgrass occurs at Creston, Cranbrook, and Kikomun Creek, as well as along the Kootenay River.
Similar Species: Dense Silky Bentgrass resembles *Agrostis* spp. Hitchcock (1969) places it in the *Agrostis* genus, but Douglas et al. (1994) have placed it in a separate genus. Their treatment separates *Apera* from *Agrostis* based on the lemma awn. In *Apera* the lemma awn is longer than 5.5 mm, and arises from just below the tip—whereas in *Agrostis* it arises at or below the midpoint. The callus of *Agrostis* can also be minutely bearded.



This genus of 300 species thrives in stony, arid soils. The name derives from the Latin *arista* = awn, because many of the species have extremely long awns. There are two species of *Aristida* occurring in British Columbia, *Aristida oligantha* (an annual) and *A. longiseta* (a perennial).

Aristida longiseta Steud. var. ***robusta*** Merr.
Red Three-awn

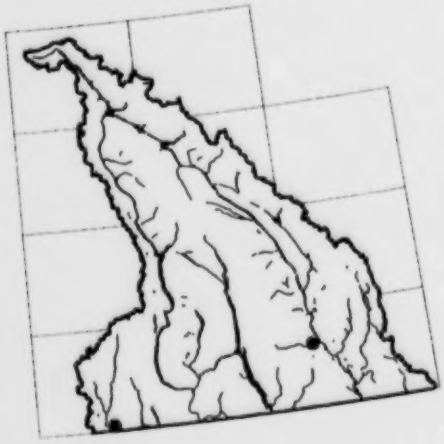
Plant: *Aristida longiseta* is a native species that grows 20–40 cm tall. It is a rough, strongly tufted perennial. The narrow pyramid-shaped flowerhead has open upward-pointing branches and is dominated by long, sharp awns.

Leaves and Stem: The sheaths are open and the ligules are less than 0.5 mm high in the front and often appear as a short fringe of hairs. In front of the ligules there are several long hairs (2–3 mm). The inrolled leaf blades are rough and are 1–2 mm wide.

Flowerhead and Flowers: The flowerhead is 5–10 cm long and is narrow with a few open upward-pointing branches. The glumes are awn-tipped. The hardened, flattened callus is sharply pointed and extends approximately 1 mm. The lemma tip splits into three 5- to 8-cm-long awns, with the lateral awns widely separated from the central one. The overall impression of this grass in flower is one of many diverging awns.

Habitat: Red Three-awn grows on dry grassland sites and bare rocky soils in the steppe and montane zones. In the Columbia Basin region the species occurs at Kimberley and Midway.

Similar Species: Red Three-awn is a distinctive species. The diverging awns are sometimes confused with Needle-and-thread Grass (*Stipa comata*), which has long awns but only one awn per spikelet.



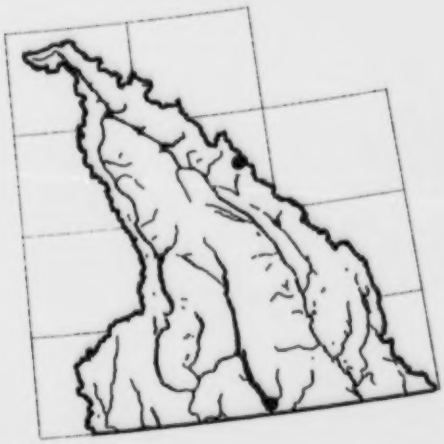
Oats (called *Avena* in Latin) comprise a small group of species from the Old World. They have large, drooping flowerheads and stout, twisted, bent awns growing from the back of the lemmas.

***Avena*—Adapted from Douglas et al. (1994)**

1a. Lemmas hairy with bent awns on the lower two lemmas; awns extend from the spikelet..... *Avena fatua*
1b. Lemmas smooth with straight awns on the lower lemmas or awnless... ..... *Avena sativa*

***Avena fatua* L.**
Wild Oat

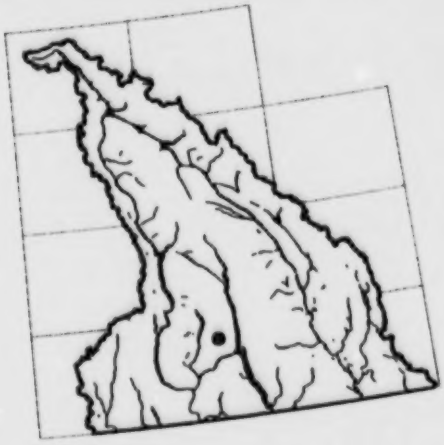
Plant: *Avena fatua* is an introduced species that grows to 80 cm tall. It is an annual with large, open, drooping flowerheads.
Leaves and Stem: The sheaths are open and there are no auricles. The membrane-like ligules are 3–6 mm high and have a hairy upper edge. The flat leaf blade is 3–10 mm wide and feels rough due to scattered long hairs.
Flowerhead and Flowers: The open flowerhead has two or three flowers per spikelet. The membrane-like glumes are equal and extend past the flowers. The flowers readily break from the stem axis at maturity above the glumes. The lemmas are hardened and densely hairy at the base near the callus. The pointed callus is covered in a dense beard. The lemma point is membrane-like and has two teeth that are 1 mm long. The first two flowers have twisted and bent awns that are up to 4 cm long.
Habitat: Wild Oat was introduced from Eurasia. It occurs most often on waste ground, and is a weed in grain fields. In the Columbia Basin region it grows at Creston and Yoho National Park.
Similar Species: Wild Oat resembles Common Oat (*Avena sativa*), but Wild Oat has a more hairy lemma and a long, bent awn, whereas Common Oat does not. The lemma tip on Common Oat is thickened, unlike Wild Oat, which has a thin membrane-like tip.



***Avena sativa* L.**
Common Oat

Plant: *Avena sativa* is an introduced species that grows to 80 cm tall. It is an annual with large, open, drooping flowerheads.
Leaves and Stem: The sheaths are open and there are no auricles. The stem ranges from smooth to rough. The membrane-like ligules have 2- to 4-mm-high hairs along the edge.

Flowerhead and Flowers: The open pyramid-shaped flowerhead has spikelets that are two- to three-flowered. The glumes are unequal and exceed the flowers in length. The lemmas are smooth and thickened at the tip. The lemma may have two shallow teeth at the tip. The callus may be either bearded or naked. When present, the lemma awn is 15 mm longer than the lemma and is not bent. The lemma of the first flower can be awned, but there is no awn on the second flower.
Habitat: Common Oat grows on roadsides, railways, and waste places. Introduced from Eurasia, it does not persist as an escape from cultivation for more than a year. In the Columbia Basin region it was collected only at Kokanee Glacier Park.
Similar Species: Common Oat resembles Wild Oat, but Common Oat has a less hairy lemma and does not have a bend in the awn. The lemma tip on Common Oat is thickened and firm, unlike Wild Oat, which has a thin membrane-like tip.

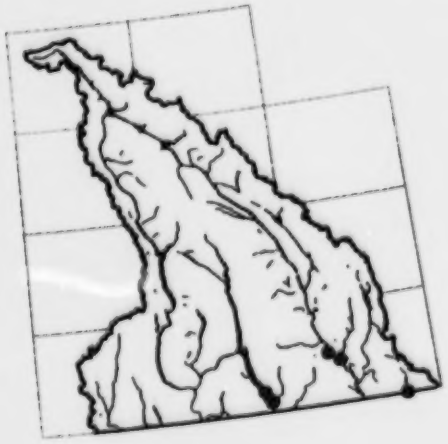


This genus has two species. It was named after Johann Beckmann, a German botanist. The species in this genus have uniquely winged, rounded glumes.

Beckmannia syzigachne (Steud.) ssp. ***baicalensis*** (Kusnez.) Koyama & Kawano
American Sloughgrass

Plant: *Beckmannia syzigachne* is a native species that grows to 1 m tall. It is a stout annual, often with stolons, and a narrow, congested flowerhead up to 30 cm long.
Leaves and Stem: The sheath is open and there are no auricles. The ligule is 6–11 mm long, pointed and hairy, and has a smooth upper edge. The flat leaf blades are 5–10 mm wide.

Flowerhead and Flowers: The narrow flowerhead has many one-flowered overlapping spikelets pressed against the spike axis. The equal glumes are compressed, slightly wrinkled, and semi-circular with a deep keel and a pointed tip. They are shorter than the flower. Lance-shaped lemmas have a sharp tip and are much narrower than the glumes.
Habitat: American Sloughgrass grows along the edges of ponds and ditches and in wet meadows and marshes up to the montane zone. It is palatable to livestock and is often locally common enough to be an important hay crop. In the Columbia Basin region, American Sloughgrass occurs at Creston Flats, Baker, Sage Creek, and Cranbrook.
Similar Species: American Sloughgrass has a very distinctive appearance that cannot be confused with other species found in the Columbia Basin region.



Bouteloua species range throughout the Americas. The name honours Esteban Boutelou, a Spanish professor of agriculture. Gramma grasses thrive in deserts and grasslands, and are more widespread to the east and south of British Columbia as a major component of the grasslands. They contribute important native forage. Only a single species occurs in the Columbia Basin region of British Columbia. The only specimen in the Royal British Columbia Museum collection comes from Rooseville. Douglas et al. (1998) have documented other sites.

Blue grama grass has been Red listed in British Columbia by the Conservation Data Centre, and can be found on the Provincial Tracking List (CDC database 1998; Douglas et al. 1998). It occurs in the southern interior, as well as along the southern section of the Alberta / British Columbia border (Cronquist et al. 1977; Kershaw et al. 1998).

This species is rare in British Columbia, due in part to a general decline in natural grassland habitat in the province, and, in part, to specialized environmental requirements. These requirements include an early summer rain to help seed germination, which is uncommon in the dry valley bottoms west of the Rocky Mountains.

Bouteloua gracilis (H. B. K.) Lag. ex Steud.
Blue Grama

Plant: *Bouteloua gracilis* is a native species that grows 20–50 cm tall. It is a densely tufted, mat-forming perennial with slender stems arising out of short rhizomes. It can be distinguished by its dense, brush-like flowerhead with 20–80 spikelets per spike. On fresh plants, the purplish spikes are straight and horizontal.

Leaves and Stem: The sheaths and collars are smooth to finely hairy. The throat of the sheath has 1- to 2-mm-long stiff hairs. The ligules are 0.5 mm long. Flat 1- to 2-mm-wide leaves grow from the base of the plant and remain there after dieback. These dried leaves are twisted or curled. The leaf edges can be either flat or rolled inward—like a straw—and they are either sparsely hairy or smooth.

Flowerhead and Flowers: The dense flowerhead is toothbrush-like and consists of 20–80 spikelets per branch. These purplish spikelets form two rows on one side of the stem axis. Each spikelet is approximately 5–6 mm long and has one, two, or three flowers. The sharply pointed glumes are 2.5–5 mm long and have hairs along the keel. The longest glume equals the length of the spikelet. The flowers of Blue Grama consist of a fertile lemma with an awn-tipped lobe and a palea equalling the lemma. Sterile lemmas make up the rest of the spikelet, some with awns up to 5–6 mm long, and others that are unawned. The overall appearance of a fresh flowerhead is of two insects perched on a stem.

Habitat: Blue Grama is an important component of the grasslands to the east of the Rocky Mountains, and it grows on dry sites in the steppe zone. It most likely comes into the Columbia Basin region on hay and manure when horses are transported from southern Alberta, where it is fairly common (G. Berg, pers. comm., 1999).

Similar Species: None in British Columbia.

Bromes make up a very large group of common grasses. There are introduced and native species, both of which can grow in weedy disturbed settings and in naturally disturbed situations. Generally, the native species are perennials; that is, they have evidence of last year's culms or leaves still attached to the crown, whereas the introduced species are annuals. Identifying perennial habit is critical in separating *Bromus* species; however, it is not always easy to do, especially in our region. Many of the annuals establish a vigorous root system over the winter and appear to have the habit of a perennial. The leaf sheaths of *Bromus* are closed all the way up to near the throat, and form a tube that encloses the culm.

Bromes all have small teeth at the tip of the lemma (apical teeth), and Douglas et al. (1994) use the size of these apical teeth as a critical character to make the distinction between annuals and perennials. Annuals have long, obvious teeth at the end of the lemma, but in perennials you must search for these carefully. Often, especially in mature specimens, the teeth are located on the inside face of the robust awn. If you are following an identification key and you miss these, you will mistakenly follow the key into the genus *Festuca*. Do not depend on the presence of the teeth as a sole character in determining whether a grass is a brome—observe the other characters as well. There is one *Festuca* found in the Columbia Basin region, *Festuca subuliflora*, that has a forked tip on the lemma.

Bromus spikelets have two very noticeable and distinct forms: one form has a very compressed or flattened appearance with a prominent keel along the ridge (back) of the lemma; and the other form does not have this keel and appears to have a rounded shape across the back of the lemma. To check these, take a lemma and cut across it. Keeled lemmas appear folded along the back; rounded lemmas do not. The spread of the flowerhead also divides the bromes into two types. Some flowerheads appear to be open, spreading away from the stem with long branches that droop. The other group has a flowerhead that appears close to the stem and appressed, with very short, upright branches. Finally, *Bromus* seems to have three groupings according to height. Tall bromes are 50–180 cm, medium bromes are 40–120 cm, and short bromes are 5–90 cm. Height depends on site characteristics, so if the site is poor, size will be shorter. For example, a *Bromus sitchensis* on a marginal site may be less than 50 cm tall.

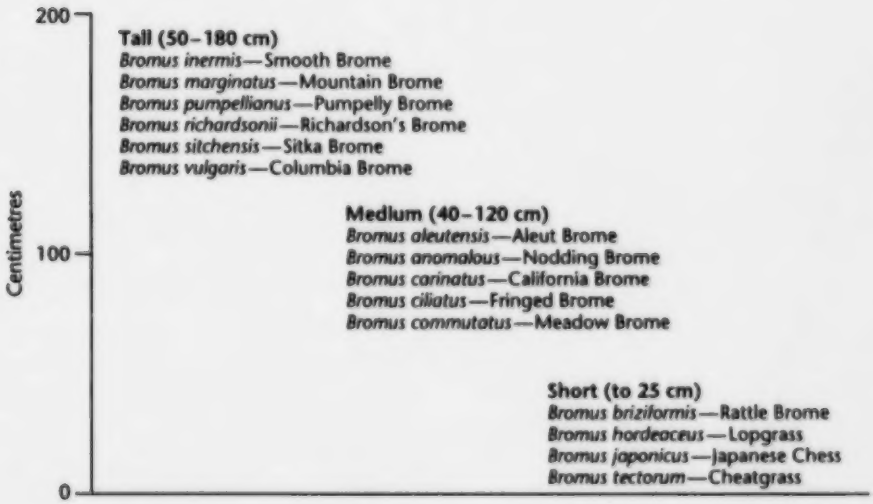
Pavlick's (1995) treatment of *Bromus* is the most recent and comprehensive in North America.

***Bromus*—Adapted from Pavlick (1995)**

1a. Spikelets compressed, lemmas keeled 2
  2a. Plants annual or biennial . . . . . *Bromus carinatus*
  2b. Plants perennial 3
    3a. Lowermost flowerhead branches over 10 cm long and spreading; bearing one or two large spikelets at the branch ends. . . . . *Bromus sitchensis*
    3b. Lowermost flowerhead branches shorter, bearing spikelets along the branch 4
      4a. Plants of disturbed areas inland . . . . . *Bromus aleutensis*
      4b. Plants of native grasslands . . . . . *Bromus marginatus*

1b. Spikelets not compressed, lemmas more or less rounded. 5
5a. Plants perennial 6
6a. Creeping rhizomes present; lemma awnless or with awn up to 6 mm long; auricles present. 7
7a. Stem nodes smooth; leaves smooth . . . . . *Bromus inermis*
7b. Stem nodes hairy; leaves with short dense hairs. . . . . *Bromus pumpellianus*
6b. Creeping rhizomes absent; lemmas awned 8
8a. Awns 6–12 mm long . . . . . *Bromus vulgaris*
8b. Awns less than 6 mm long. 9
9a. Sheaths often hairy near the junction of leaf blades and sheaths . . . . . *Bromus richardsonii*
9b. Sheaths not hairy near the junction of leaf blades and sheaths 10
10a. Lemmas smooth across the back . . . . . *Bromus ciliatus*
10b. Lemmas hairy across the back . . . . . *Bromus anomalus*
5b. Plants annual 11
11a. Spikelets wedge-shaped and wider at the top; awn usually longer than the lemma . . . . . *Bromus tectorum*
11b. Spikelets oval to lance-shaped; awn as long as or shorter than the lemma 12
12a. Lemmas awnless; spikelets oval-shaped . . . *Bromus briziformis*
12b. Lemma awn 2–13 mm long; spikelets narrower 13
13a. Lemmas papery with prominent raised ridges. . . . . *Bromus hordeaceus*
13b. Lemmas leathery with ridges but not raised ridges 14
14a. Flowerhead branches not flexuous but stiffly spreading; awns straight . . . . . *Bromus commutatus*
14b. Flowerhead branches lax or flexuous; awns bent away from the axis . . . . . *Bromus japonicus*

Heights of *Bromus* species



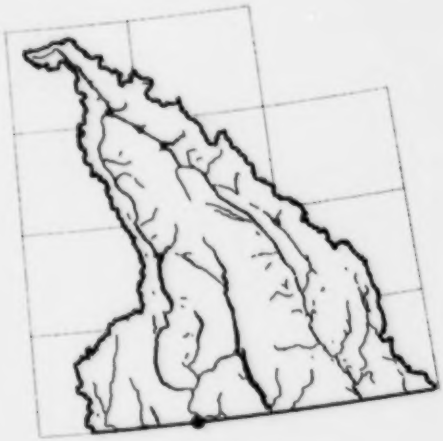
Bromus aleutensis Trin. ex Griseb.
Aleut Brome

Plant: *Bromus aleutensis* is a native species that grows 40–130 cm tall. It is a perennial with no rhizome. The flowerhead is erect and slightly lax, with compressed (flattened) spikelets at the end of the branches. Sometimes it has a droopy appearance, but mostly it appears to have short, upright branches.
Leaves and Stem: The leaf sheaths are hairless to moderately hairy with short hairs that are slanted backwards toward the base of the sheath. The lower portions of the nodes are hairy. There are rarely any auricles, and if they are visible they are very small. The ligule is 3.5–5 mm high.
Flowerhead and Flowers: The flowerhead is 10–28 cm long and erect, but can have spreading, not drooping, branches. The spikelets are 2–4 cm long and appear flattened. The lemma is keeled with a prominent nerve up the centre. Usually there are four to eight flowers per spikelet. One glume is two or more times longer than the other, and both glumes are much shorter than the first flower. The lemma is softly hairy, with a wide, almost transparent or translucent (hyaline) margin. The awn is 3–10 mm long and straight.
Habitat: Aleut Brome occurs in the Columbia Basin region near Kaslo, scattered on sandy and disturbed soil. More commonly, Aleut Brome grows along the coast from Alaska to the Olympic Mountains.
Similar Species: This species is very similar to Alaska Brome (*Bromus sitchensis*). In Douglas et al. (1994), Aleut Brome is considered to be the same as Alaska Brome. Pavlick (1995) describes Alaska Brome as having longer branches at the base of the flowerhead (>10 cm) and with an angle of branching greater that 90°.

Bromus anomalus Rupr. ex Fourn.
Nodding Brome

Plant: *Bromus anomalus* is a native species that grows 40–90 cm tall. It is a perennial Brome with an open, spreading flowerhead.
Leaves and Stem: The leaf sheaths are hairless to hairy, with long soft hairs. The nodes are hairy to hairless. There may or may not be auricles. The ligules are 1 mm long and blunt (squared). The 3- to 5-mm-wide leaf blades have various amounts of hairiness.
Flowerhead and Flowers: The flowerhead is 10–20 cm long and open. The glumes are hairy, and the lemmas are hairy across the back and along the margins. This 7- to 11-flowered spikelet is not compressed and the lemma is rounded across the back. The first glume is much longer than the second glume, which is scarcely 1–3 mm long. Both are shorter than the first flower. The teeth at the tip of the lemma are tiny, so they are easy to miss on this species. The awn is 1–3 mm long.
Habitat: Nodding Brome occurs in the Columbia Basin region on dry, open, rocky slopes such as those along the Pend'Oreille River.

Similar Species: Nodding Brome can initially be confused with Fringed Brome (*Bromus ciliatus*), especially because of the hairs along the margin of the lemma and the open flowerhead in both species—but Fringed Brome has no hairiness on the back of the lemma.



Bromus briziformis Fisch. & C.A. Mey.
Rattle Brome, Rattle Chess

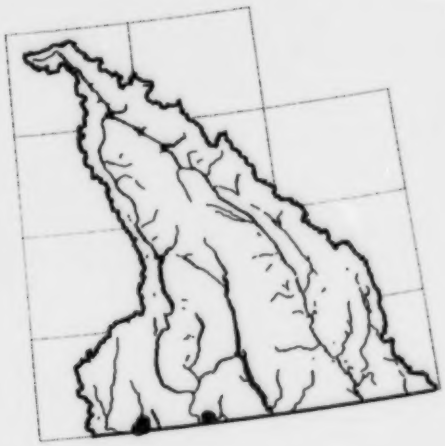
Plant: *Bromus briziformis* is an introduced species that grows 30–62 cm tall. It is an annual with an open, and often nodding, flowerhead. This grass has wedge-shaped spikelets and short awns on the lemma.

Leaves and Stem: The leaf sheaths are softly hairy and closed nearly to the top. The leaf blades are 2–5 mm wide and hairy on both sides. The ligules are 0.5–2 mm long, and have a rough edge or hairs along the edge. There are no auricles.

Flowerhead and Flowers: The flowerhead has long branches with one spikelet at the end of each branch. The spikelets are approximately 15–27 mm long. One glume is almost half the size of the other and both are shorter than the first flower. The lemma is smooth or has a slightly bumpy feeling. The margin of the lemma forms a wide angle from the lemma tip to midway along the lemma and has a wide transparent (hyaline) margin. If there are awns, they are less than 0.8 mm long.

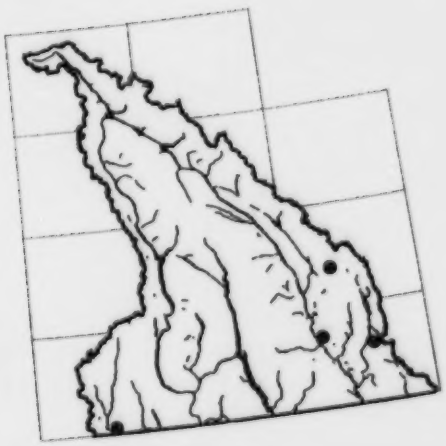
Habitat: Rattle Brome was introduced from southwest Asia and Europe. In the Columbia Basin region this grass grows in open, disturbed grasslands such as overgrazed rangelands and eroding hills. In particular, it occurs along Charbonneau Creek and near Grand Forks.

Similar Species: The flowerhead of Rattle Brome has a unique look and does not resemble any of our native species. It looks like an ornamental grass, and the stylized shape is perfect for flower arrangements.



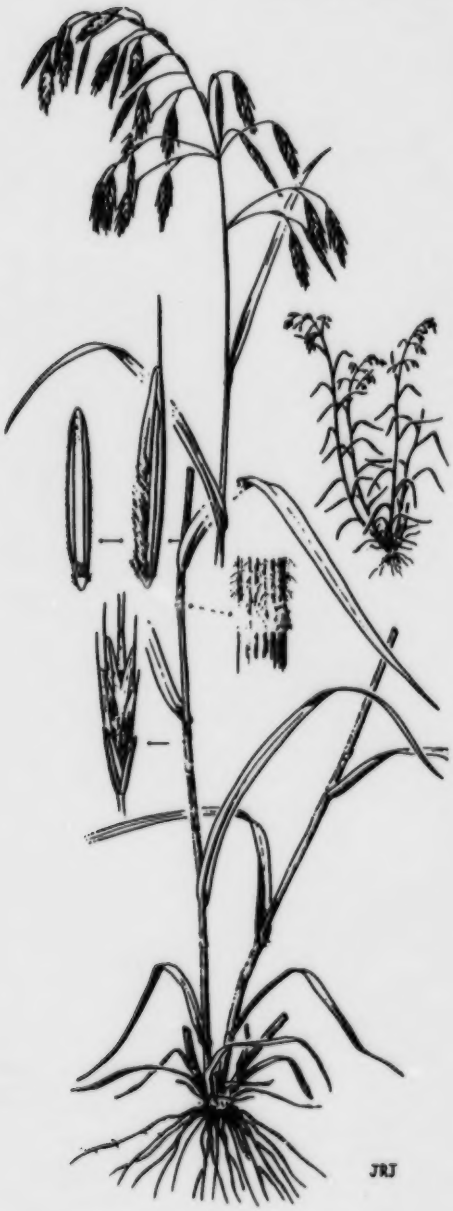
Bromus carinatus Hook. & Arn. var. ***hookerianus*** (Thurb.) Shear
California Brome

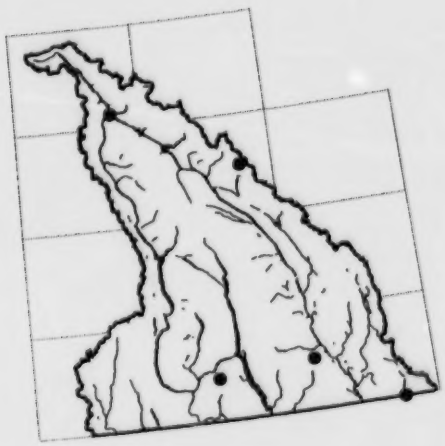
Plant: *Bromus carinatus* is a native species that grows 50–100 cm tall. It is a tuft-forming annual, biennial, or perennial with a large, open, somewhat drooping flowerhead. Biennial grasses will still have a build-up of dead leaves at the end of the growing season (like a perennial), but usually do not have a culm—this forms in the second year.
Leaves and Stem: The soft hairy to smooth sheaths are closed nearly to the top. The thick, tough, flat leaf blades are generally 3–6 mm wide (range 2–15 mm) and 10–30 cm long. The ligule is 2–3 mm long with a tattered edge. Small auricles may be present, but are difficult to see without a hand lens.
Flowerhead and Flowers: The loose, open flowerhead ranges from 15 to 40 cm long. The ascending to drooping branches of the flowerhead usually end with several spikelets. The large, very flattened spikelets are 2–4 cm long and have several (more than seven) flowers. The two glumes are slightly unequal in length and much shorter than the spikelet. The lemmas are 12–20 mm long and keeled on the back, and have two tiny teeth at the tip. A 6- to 15-mm-long awn projects between the two teeth of the lemma.
Habitat: Pavlick (1995) recognizes two varieties of California Brome in British Columbia. Variety *carinatus* occurs west of the Cascades from southeastern Vancouver Island southward, and is an annual. Variety *hookerianus* occurs in the Columbia River Basin to southeastern British Columbia, and is a perennial. It occurs on grassy openings or dry slopes on Martin Ridge and near Midway
Similar Species: California Brome closely resembles Alaska Brome (*Bromus sitchensis*). Alaska Brome has a more spreading and drooping appearance than California Brome. Alaska Brome has no auricles, whereas California Brome does, though they may be minute. Spikelets of California Brome occur nearly to the base of the flowerhead, whereas in Alaska Brome they spread out toward the tips. The leaf blades of Alaska Brome are mostly greater than 10 mm wide, whereas they are mostly less than 10 mm wide in California Brome. California Brome intergrades with Mountain Brome (*Bromus marginatus*), and many authors consider them to be the same species. Mountain Brome has wider leaf blades (6–12 mm) and the flowerhead has erect and ascending lower branches compared to California Brome, which has drooping branches.



***Bromus ciliatus* L.**
Fringed Brome

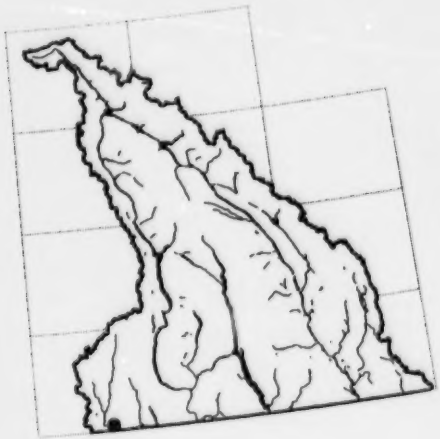
Plant: *Bromus ciliatus* is a native species that grows 45–150 cm tall. It is a tuft-forming perennial with no rhizomes and an open, drooping flowerhead.
Leaves and Stem: The sheaths are hairless. but sometimes may have short backward-facing hairs. The nodes are hairy, but sometimes the lower nodes may be smooth. Leaf blades are 4–10 mm wide, with scattered hairs on both surfaces or just on the upper surface. There are no auricles.
Flowerhead and Flowers: The flowerhead is 15–25 cm long with long ascending-to-drooping open branches. The first glume is slightly shorter than the second, and both are much shorter than the first flower. The lemma of this species has obvious hairs along the margin of the lower half but is smooth across the back. This character can be observed with a good hand lens and is visible without dissection.
Habitat: Fringed Brome ranges widely across all of British Columbia in damp meadows, thickets, and moist woods, and along streambanks. In the Columbia Basin region it grows near Nelson, and along the Flathead River and Otto Creek.
Similar Species: Richardson's Brome (*Bromus richardsonii*), is similar to Finged Brome in that it has hairs on the margin of the lemma, but, in the lower flower of the spikelet, the back of the lemma is smooth, whereas the lemma of Fringed Brome is rough across the back.





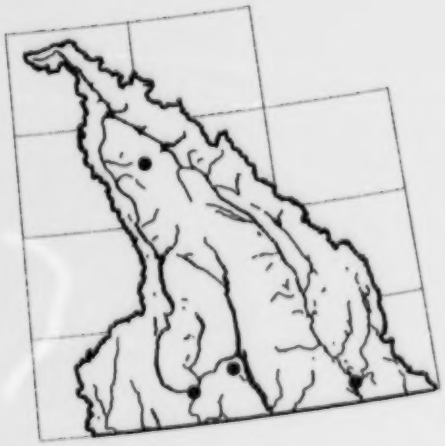
Bromus commutatus Schrad.
Meadow Brome

Plant: *Bromus commutatus* is an introduced species that grows 40–120 cm tall. It is an annual Brome. The flowerhead is spreading and somewhat loose, but the branches are erect or ascending and not spreading or drooping.
Leaves and Stem: The leaf sheaths are closed nearly to the top and are densely hairy, with backward-facing hairs. There is dense hairiness at and just below the nodes. The ligule is 1–2.5 cm long. The flat leaf blades are 2–5 mm wide and have long straight hairs on both sides. There are no auricles.
Flowerhead and Flowers: The flowerhead is 7–16 cm long, open, and spreading. The unequal glumes are shorter than the first flowers. The spikelets are flattened. The hardened lemmas have veins but not raised ridges. They feel rough to the touch along the margins. The awn is 3–10 mm long and appears almost hair-like.
Habitat: Meadow Brome grows in disturbed sites in fields, wasteplaces, and roadsides near Midway.
Similar Species: Meadow Brome resembles European Smooth Brome (*Bromus racemosus*), which has not been collected in the Columbia Basin region. Pavlick (1995) mentions that *B. racemosus* may be a poorly developed form of Meadow Brome.



***Bromus hordeaceus* L.**
***Bromus mollis* L.**
Soft Brome

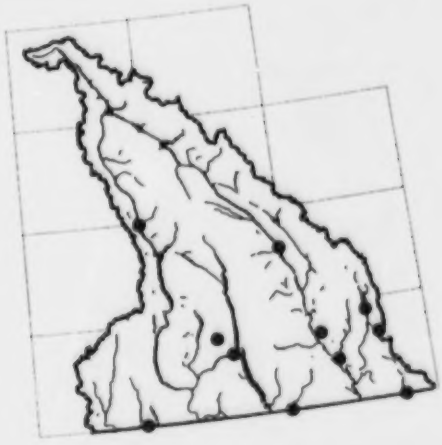
Plant: *Bromus hordeaceus* is an introduced species that grows 20–50 cm tall. It is either annual or biennial. The plant has short flowerhead branches and the spikelets appear close to the stem axis—almost sessile.
Leaves and Stem: Lower leaf sheaths appear densely to softly hairy, whereas the upper ones are less hairy. The short ligule is 1–1.5 mm high and hairy. Leaf blades are hairy on the upper side or both sides. There are no auricles.
Flowerhead and Flowers: The flowerhead is erect and the branchlets (pedicels) are pressed against the main stem. The pedicels are sometimes shorter than the spikelets and therefore it appears as if there are no branches. The glumes are short-hairy to hairless. One glume is slightly shorter than the other and both are shorter than the first flower. The papery lemma has raised ridges on the back with short hairs or without hairs. These prominent ridges are an important feature in distinguishing Soft Brome from Meadow Brome. The edge of the lemma is bluntly angled from the tip to midway along the spikelet and has a wide hyaline (transparent) margin. The 6- to 8-mm-long awns are flattened at the base. These awns can be slightly curved outward but are not strictly reflexed or bent.
Habitat: Soft Brome was introduced from Europe and has spread throughout North America from the west to east coast. Around Nelson and Castlegar, Soft Brome grows on disturbed ground, fields, and wet lakeshores in the lowland, steppe, and montane zones. One interesting record is from Waldo, which is now under water in Lake Koocanusa.
Similar Species: Soft Brome is also called *Bromus mollis* and it has been said to intergrade with Meadow Brome, but the short, spike-like flowerhead differentiates it from Meadow Brome.



Bromus inermis Leyss.
Smooth Brome

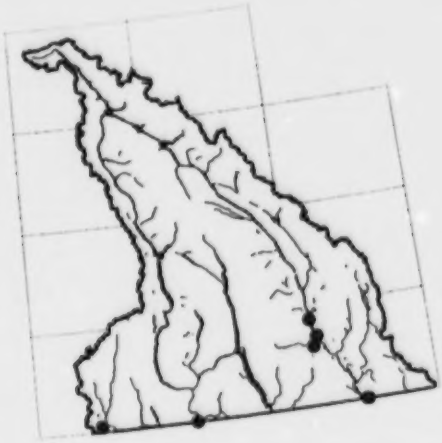
Plant: *Bromus inermis* is an introduced species that grows 50–130 cm tall. It is a rhizomatous perennial with a narrow but branched flowerhead.
Leaves and Stem: The mostly smooth stems have erect or somewhat spreading branches at the base. The sheaths are mostly smooth and closed nearly to the top. Leaf blades are flat, 5 mm wide, and usually drooping. The ligule is 3 mm high. If auricles are present, they are < 0.5 mm, so a hand lens is required to see them.

Flowerhead and Flowers: The narrowed to somewhat open-branched flowerhead is 10–20 cm long. Branches are ascending to spreading. The two unequal glumes are much smaller that the spikelet. The lemma has either no awn or a very short one (< 3 mm). The back of the lemma is rounded and not keeled.
Habitat: Smooth Brome was known as Hungarian Brome when it was introduced from Eurasia, around 1875. It is widespread throughout the Columbia Basin region in weedy sites everywhere except in the alpine zone.
Similar Species: Many authors consider Smooth Brome and Pumpelly Brome (*Bromus pumpellianus*) to be the same species. Pavlick (1995) considers them two separate species, distinguished by a hairy lemma in Pumpelly Brome. Both species intergrade and are fully interfertile, but we will consider them separate for the purposes of this guide. Smooth Brome resembles Alaska Brome (*Bromus sitchensis*) and California Brome. The spikelets of Smooth Brome are not flattened (compressed) like those of California Brome because the backs of the lemmas are rounded, not keeled.



Bromus japonicus Thunb.
Japanese Brome

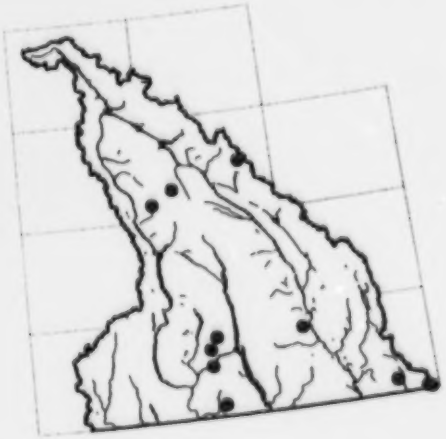
Plant: *Bromus japonicus* is an introduced species that grows 25–70 cm tall. It is an annual with a spreading, branched flowerhead.
Leaves and Stem: The leaf sheaths are soft hairy to densely hairy. The ligules are 1–2.2 mm long and are hairy or lacerate along the edges. Auricles are lacking. The softly hairy leaf blades are 1.5–3 mm wide.
Flowerhead and Flowers: The flowerhead is 10–22 cm long and the branches are spreading, sometimes nodding or drooping, and somewhat slender. The glumes are hairless to slightly rough. Glumes are shorter than the first flower and one glume is about 2/3 the length of the other. The lemmas are almost leathery in texture and have seven to nine nerves. The awn is very noticeable, 8–13 mm long, often twisted, flattened at the base, and angled away from the back of the lemma. This awn arises a short distance from the tip of the lemma and appears almost reflexed.
Habitat: Japanese Brome was introduced from central and southeast Europe and Asia. It is most often found on disturbed open grasslands, roadsides, or alkaline flats. In the Columbia Basin region, this species grows near Roosville, Cranbrook, and Fort Steele.
Similar Species: Japanese Brome can look different, depending on the stage of maturity. When immature, the awns do not diverge but appear to be straight. The very hairy leaves and the sheaths are a good way to distinguish Japanese Brome in the field.



Bromus marginatus Nees
Mountain Brome

Plant: *Bromus marginatus* is a native species that grows 60–180 cm tall. It is a tufted perennial. Sometimes the culm appears very thick and is softly hairy. The pedicles are longer than the spikelets, but do not droop.
Leaves and Stem: The leaf sheaths are sparsely to densely hairly with dense hairs around the throat. The ligule is 2–3.5 mm long, and appears to be gnawed or sparsely hairy along the edge. The leaf blades are flat and 6–12 mm wide. The leaves can be hairy to hairless. There are no auricles.
Flowerhead and Flowers: The flowerhead is mostly narrow and 10–30 cm long, with erect branches. The spikelets appear compressed and large with six to nine flowers. The lemmas are leathery with seven to nine distinct nerves. The keeled lemmas are hairy along the margins and back, or hairy only on the margins and smooth on the back. The awns are 4–7 mm long.

Habitat: Mountain Brome grows in grasslands, open slopes, shrublands, and openings in the forests. This species is located at Six Mile Lake and Nelson, and along the Flathead River in the Columbia Basin region.
Similar Species: Mountain Brome resembles California Brome, and is considered by Douglas et al. (1994) to be synonymous. Pavlick (1995) distinguishes California Brome from Mountain Brome by the amount of spreading on the lower branches of the flowerhead. California Brome appears to spread more widely. See description for California Brome (*Bromus carinatus*).

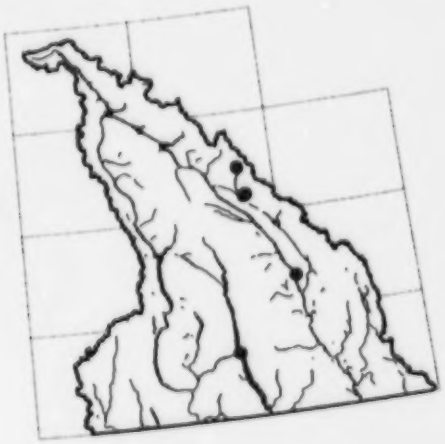


Bromus pumpellianus Scribn.
Pumpelly Brome

Plant: *Bromus pumpellianus* is a native species that grows 50–120 cm tall. It is an erect perennial with a rhizome. The stout culm can have hairy or hairless nodes. The flowerhead has a narrow to open form. The spikelets do not appear to be strongly compressed.
Leaves and Stem: The nodes are densely hairy to lightly hairy, and even sometimes hairless. There are short auricles on the lower leaves but these may be missing on the upper leaves. The leaves are flat, the leaf sheaths have soft long hairs, and the ligules are 3 mm long.
Flowerhead and Flowers: The flowerhead is 10–20 cm long and stands erect or nods slightly. The erect branches are longer than the spikelets. The lemmas are hairy along the margins and are silky-hairy across the back; but the glumes are hairless, so the overall appearance is one of having no hairs because the glumes almost cover the lower lemma. Glumes are shorter than the first flower. The awn is less than 6 mm long and in many cases is not visible. In this species it is difficult to see the two tiny teeth at the tip of the lemma.
Habitat: Pumpelly Brome has been collected on sandy or gravelly streambanks and lakeshores along the Flathead River.
Similar Species: Pumpelly Brome is considered by some authors to be the same as Smooth Brome. Pumpelly Brome ranges from the Arctic southward along the Cordillera to Colorado. Specimens of Pumpelly Brome may superficially appear to be a smooth brome such as Smooth Brome, except that its lemmas are hairy.

Bromus richardsonii Link
Richardson's Brome

Plant: *Bromus richardsonii* is a native species that grows 50–145 cm tall. It is a tufted perennial with hairless nodes and internodes. The flowerhead is open, with the spikelets drooping from fine branchlets.
Leaves and Stem: Leaf sheaths are variously finely hairy to hairless, but often tufted-hairy at the ligule. The ligules are 0.4–2 mm long and appear to be hairy or gnawed. The flat leaf blades are 3–12 mm wide and hairless. There are no auricles.
Flowerhead and Flowers: The open, slightly nodding flowerhead is 10–25 cm long, with slender branches that spread or droop. One glume is about 2/3 the length of the other, and both are shorter than the first flower. The glumes are hairless and often have a small toothlike point at the tip. The lemmas are more or less covered in long straight hairs on the lower half of the margins. The lower spikelets may also be hairless on the back. The uppermost spikelets have short, appressed hairs. The awn is 2–5 mm long.
Habitat: Richardson's Brome occurs on open sites such as creek beds, eroding banks, and alluvial fans in the montane and subalpine zones, such as those around Fairmont Hot Springs, Emerald Lake, and Kootenay Lake.
Similar Species: Hitchcock et al. (1969) considered Richardson's Brome to be similar to Fringed Brome, but Pavlick (1995) distinguishes the two species by the fact that the culm nodes of Richardson's Brome are mostly hairless and the leaf sheaths often have tufts of long straight hairs. Fringed Brome has hairy nodes (although sometimes the lower nodes are smooth), and the leaf sheaths are mostly hairless, but sometimes with short, backward-facing hairs.



Bromus sitchensis Trin.
Alaska Brome

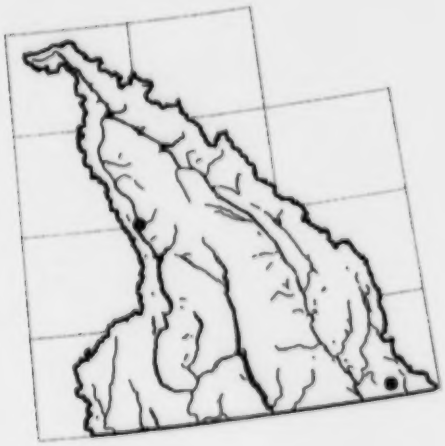
Plant: *Bromus sitchensis* is a native species that grows 50–180 cm tall. It is a stout perennial without rhizomes, and has a large, branched, open flowerhead.

Leaves and Stem: The leaf sheaths are hairless or covered by long scattered hairs. The sheaths are closed nearly to the top. There are no auricles. The ligules are 3–4 mm long with a ragged to hairy margin. The flat leaves are 8–15 mm broad and sparsely hairy with long hairs on the upper or both sides.

Flowerhead and Flowers: The flowerhead in Sitka Brome is very open and 10–35 cm long. The pedicles or stalklets spread and droop somewhat. Strongly flattened spikelets often hang from the ends of the branches. The first glume is about 1/2–2/3 the length of the other, and both are much shorter than the first flower. Keeled lemmas bear 5- to 12-mm-long awns, have seven to nine nerves, and scattered hairs cover the back.

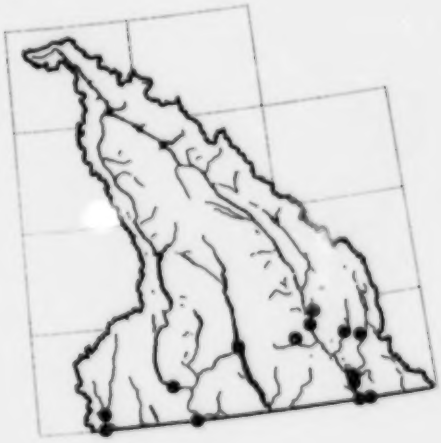
Habitat: Alaska Brome occurs on rocky soil, streambanks and exposed rocky bluffs. The specimens at the Royal BC Museum were collected along Cabin Creek and in Revelstoke Park.

Similar Species: Alaska Brome closely resembles Aleut Brome and is considered to be the same species. Douglas et al.(1994) separates Alaska Brome from California Brome based on the degree of panicle spreading and whether auricles are present. Alaska Brome has spreading panicle branches and no auricles. California Brome has tiny auricles and a spreading to drooping flowerhead.



***Bromus tectorum* L.**
Cheatgrass

Plant: *Bromus tectorum* is an introduced species that grows 5–90 cm tall. It is an annual brome with an open, spreading, and often-drooping flowerhead. Spikelets have long, prominent awns.
Leaves and Stem: The sheaths are softly hairy, though those of the upper leaves sometimes are hairless. The leaves are flat, 2–4 mm wide, and softly hairy on both leaf surfaces. Ligules are 2–3 mm long with a lacerate margin. There are no auricles.
Flowerhead and Flowers: The flowerhead is 5–20 cm long and more or less lax. The branches are flexuous and the spikelets are often purplish. The first glume is 1/2 to 2/3 the length of the second glume, and both are much shorter than the first flower. The lemmas are hairy to long-hairy over the back and often have a few longer hairs on the margins. The spikelet appears to be brushlike, and the various awns tend to terminate at the same level. The 10- to 18-mm-long awns appear longer than the spikelet.
Habitat: Cheatgrass was introduced from Europe and now occurs throughout much of the U.S. and Canada. Cheatgrass grows in wasteplaces and disturbed soils, and is a particular problem on overgrazed rangelands.
Similar Species: Cheatgrass is distinct from most of the other species in the Columbia Basin region.



Bromus vulgaris (Hook.) Shear
Columbia Brome

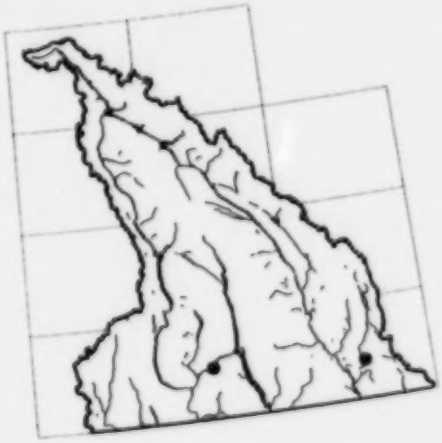
Plant: *Bromus vulgaris* is a native species that grows 60–120 cm tall. It is a perennial that grows in loose tufts with a slender, narrow, drooping flowerhead.

Leaves and Stem: The long, slender stems have few leaves along the culm and often droop. The leaf sheaths are hairy to smooth, and the culm nodes are hairy. The flat, lax leaf blades are hairy on at least one surface, and are up to 14 mm wide. The ligules are 2–6 mm long, blunt, and gnawed-looking. There are no auricles.

Flowerhead and Flowers: The open, narrow, drooping flowerhead has slender branches with few-flowered spikelets and is 10–15 cm long. The first glume is about 1/2 the length of the second, both being much shorter than the first flower. The lemmas are 8–15 mm long and coarsely hairy on the the margins. The awn is 6–12 mm long and arises at the tip.

Habitat: Columbia Brome grows in the Columbia Basin region in open forests of Douglas-fir or lodgepole pine. In particular, it has been collected near Nelson, at Long Beach, and near Morrisay.

Similar Species: The relatively small, few-flowered, drooping flowerheads with rounded spikelets are distinct features of Columbia Brome. Smooth Brome is like Columbia Brome, but it has fat spikelets and the awns are much shorter. Smooth Brome is also like Columbia Brome, but it has rhizomes rather than tufted roots.



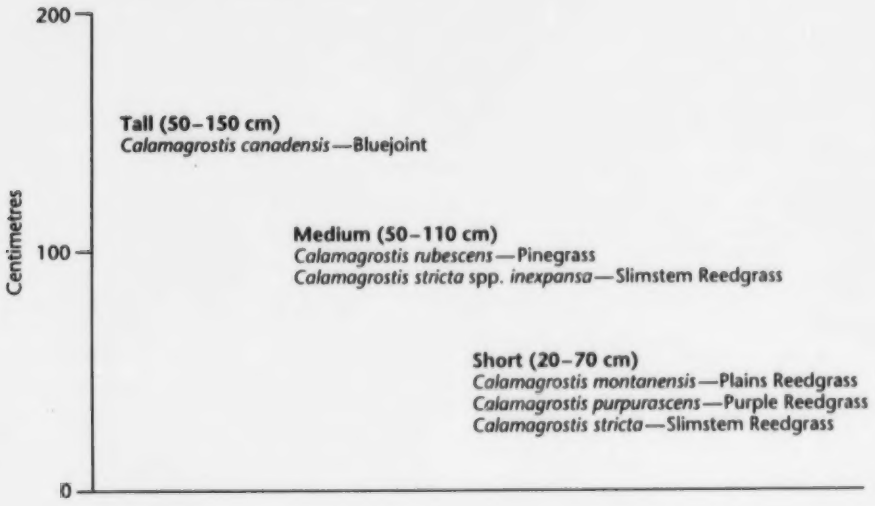
The word *agrostis* is Greek for grass, and the prefix *calamos* means reed. This genus, though reedy in appearance, is used as native forage grass in the west, especially in the montane and more northerly areas. In low wetland areas *Calamagrostis canadensis* provides wild, palatable hay for cattle, but the abundance is sporadic at best. All *Calamagrostis* species are perennial and relatively tall, with creeping rhizomes and a callus with a long, straight tuft of hairs, sometimes as long as the lemma. The spikelets are one-flowered and both glumes are equal and sharp-pointed.

All species have awns on the lemma. The important feature in determining species differences is whether the lemma awns project beyond the glume tips or just reach the glume tips. It is also important to note whether the awns are twisted and bent or straight. Whether the flowerhead is open or is pressed close to the stem is also a useful distinguishing feature. The length of the callus hairs relative to the length of the lemma helps distinguish the species as well.

***Calamagrostis*—Adapted from Douglas et al. (1994)**

1a. Lemma awns extending beyond glume tips, twisted and bent 2
2a. Glumes 4–5 mm long; leaf sheaths hairy on collars. . . . . *Calamagrostis rubescens*
2b. Glumes 4.5–8 mm long; leaf sheaths finely hairy or rough but smooth on the leaf collars . . . . . *Calamagrostis purpurascens*
1b. Lemma awns not reaching glume tips or barely extending beyond glume tips 3
3a. Flowerhead of loose branches, spreading; callus hairs abundant, 1/2 as long as lemmas . . . . . *Calamagrostis canadensis*
3b. Flowerhead contracted, branches pressed close to the axis 4
4a. Callus hairs 1/2 as long as lemmas; awns straight to twisted. . . . . *Calamagrostis stricta*
4b. Callus less than 1/2 length of the lemmas; awns twisted and bent. . . . . *Calamagrostis montanensis*

Heights of *Calamagrostis* species



Calamagrostis canadensis (Michx.) Beauv.
Bluejoint

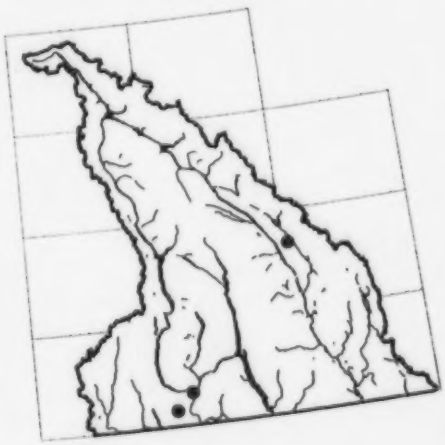
Plant: *Calamagrostis canadensis* is a native species that grows 50–150 cm tall. It is a perennial with creeping rhizomes and an open, somewhat drooping flowerhead.

Leaves and Stem: The smooth to rough sheaths are open to the node and there are usually three to eight nodes along the stem. There are no auricles and the membrane-like ligules are 3–8 mm long. The flat leaf blades are lax, rough on both surfaces, and 3–8 mm wide.

Flowerhead and Flowers: The open flowerhead can appear drooping when fully mature and is 5–30 cm long. The spikelets are numerous on the upper half of the branches. The glumes are slightly unequal and 3.0–4.5 mm long, and can be slightly purple-tinged. The edges of the glumes feel rough, and the tips are sharp-pointed; the glumes are longer than the lemma. The lemma is almost transparent along the edges, and has a delicate awn extending just to the length of the lemma or slightly beyond. The callus has hairs from 1/2 the length to the same length as the lemma, which is in contrast to the long cobwebby hairs of species in *Poa*.

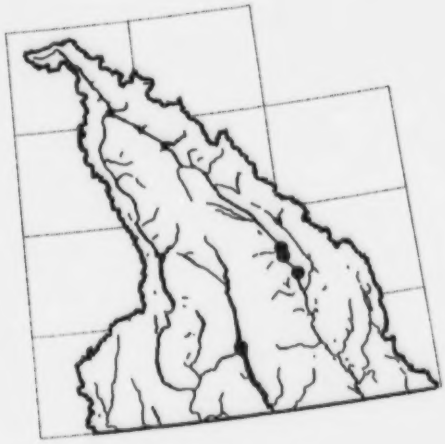
Habitat: Bluejoint grows in moist, open meadows or open forest in all zones. In the Columbia Basin region it occurs widely around lakes.

Similar Species: Bluejoint in British Columbia is divided into two intergrading varieties: *canadensis* and *langsdorfii*. Variety *canadensis* is a smaller plant, has shorter glumes than variety *langsdorfii*, and the keels of the glumes are not hairy. In addition, the margins of the lemmas are transparent and the awns of the lemma are thin and narrow and not obvious, whereas the lemma awns of variety *langsdorfii* are thicker and obvious.



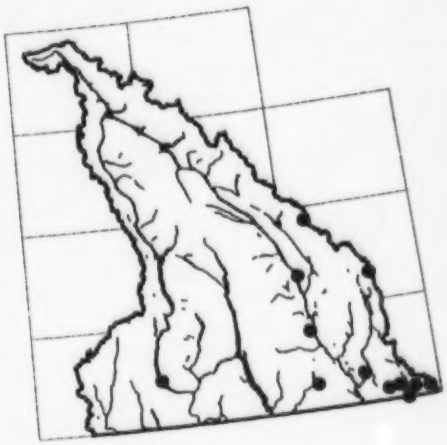
Calamagrostis montanensis (Scribn.) Scribn.
Plains Reedgrass

Plant: *Calamagrostis montanensis* is a native species that grows 30–60 cm tall. It is a perennial with rhizomes. The flowerhead is not spreading, but consists of a tight spike and has numerous spikelets at the end of the very short branchlets.
Leaves and Stem: The smooth sheath is open and there is no auricle. The stem is rough just below the flowerhead but gets smooth toward the base. The pointed ligule is 3–5 mm high and has a ragged to hairy edge. The leaves are mostly basal, stiff, inrolled, 3 mm wide, and blue-green.
Flowerhead and Flowers: The branches of the 3- to 10-cm-long flowerhead are pressed close to the stem even when mature. This character may be misleading in dried specimens because the branches tend to spread when they are pressed. There are two transparent glumes with a raised keel that has a rough feel. The glumes are about equal in length and longer than the first flower. The lemma is slightly shorter than the glumes and has blunt teeth at the tip. The coarse, bent awn equals the glume in length and begins about 1 mm from the base of the lemma. Scattered hairs, 1/2 as long as the lemma, cover the callus.
Habitat: Plains Reedgrass grows on dry grassland sites in the montane to alpine zones. In the Columbia Basin region it has been collected at Invermere and Fairmont Hotsprings and near Radium.
Similar Species: Plains Reedgrass could be confused with Pinegrass (*Calamagrostis rubescens*), but Plains Reedgrass is shorter (30 cm compared to 50–110 cm) and does not have awns that protrude beyond the glume tips, and the leaf collars do not have the tufted hairs of Pinegrass. This species is Blue listed in Douglas et al. (1998), and is rare in British Columbia.



Calamagrostis purpurascens R. Br.
Purple Reedgrass

Plant: *Calamagrostis purpurascens* is a native species that grows 30–70 cm tall. It is a strongly tufted perennial, often with short rhizomes. The purple- to bronze-tinged flowerhead is crowded along the stem axis.
Leaves and Stem: Open sheaths are smooth to rough to the touch. The ligule stands 2–4 mm high, and is blunt with ragged edges. The sides of the ligule are often higher than the back. The leaves are 2–5 mm wide, shiny, and flat when young, but become inrolled with age. The leaf edges are rough.
Flowerhead and Flowers: The flowerhead is purple to bronze-tinged and grows to 4–10 cm long. Its branches are arranged close to the axis but not spreading. The glumes are slightly unequal and rough along the raised keel. The glumes exceed the first flower. The thin lemma is 2/3 as long as the glume. A coarse, bent awn is attached near the base of the lemma and protudes beyond the lemma and the glume. The callus hairs are much shorter than the lemma.
Habitat: Purple Reedgrass grows on dry ridges and talus slopes in the upper montane to the alpine zones. In British Columbia this species occurs east of the Coast-Cascade Mountains, and in the Columbia Basin region it grows on Mount Festubert, Inverted Ridge, and Langemarck Mountain.
Similar Species: Purple Reedgrass belongs to the group of reedgrasses that have twisted or bent awns protruding beyond the glume tips. Pinegrass (*Calamagrostis rubescens*) has this character too, but the flowerhead of Purple Reedgrass is denser than that of Pinegrass.



Calamagrostis rubescens Buckl.
Pinegrass

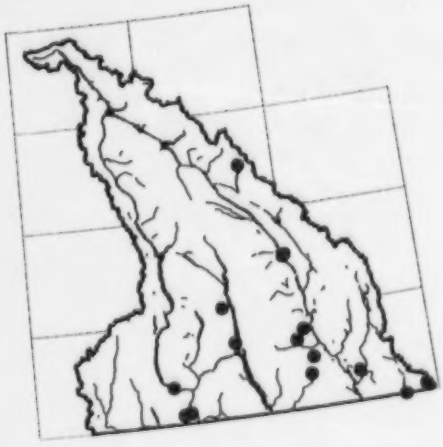
Plant: *Calamagrostis rubescens* is a native species that grows 50–110 cm tall. It is a strongly tufted, perennial grass with rhizomes. The flowerhead is tight to somewhat narrow but open.

Leaves and Stem: Open and smooth sheaths have stiff hairs around the collars where the leaf blades meet the sheaths, and the collars are covered in dense, short hairs. There are no auricles. Blunt ligules are 1–5 mm long and have a ragged edge. The flat leaves are 2–4 mm wide and rough, at least along the edges.

Flowerhead and Flowers: The flowerhead varies from slightly open to tightly closed. The nearly equal glumes are sharply pointed and nearly smooth, except along the raised keel, where there are scattered, short, stiff hairs. The papery lemma is shorter than the glumes and thin. A bent and twisted awn arises just above the base of the lemma and equals the glumes in length. The callus has short hairs barely over 1 mm long.

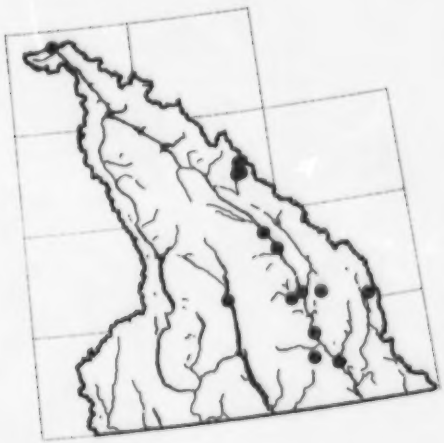
Habitat: Pinegrass grows in dry meadows, under open and closed forest canopies, and on rocky slopes. It occurs on the sandy raised terraces of the Columbia River, such as those near Invermere, and at Grand Forks, Trail, Arrow Lakes, Moyie Lake, and Silver Spring Lake.

Similar Species: Pinegrass resembles Purple Reedgrass in that both have long lemma awns that protrude beyond the glumes, and both have hairy collars. Purple Reedgrass has longer glumes (4–5 mm compared to 4.5–8 mm) than Pinegrass, and the awns protrude further.



Calamagrostis stricta (Timm) Koel.
Slimstem Reedgrass

Plant: *Calamagrostis stricta* is a native species. The subspecies *stricta* grows 20–60 cm tall, and subspecies *inexpansa* grows 40–100 cm tall. It is a stoloniferous perennial that often forms turf. The dense spike-like flowerhead ranges from a narrow pyramid (in subspecies *inexpansa*) to a narrow spike (in subspecies *stricta*).
Leaves and Stem: The open sheath is smooth and has no auricles. Ligules are 1–3 mm long and smooth-edged. The 2- to 5-mm-wide leaves are rolled inwards and feel smooth to rough.
Flowerhead and Flowers: The flowerhead of *stricta* is a narrow spike. The flowerhead of *inexpansa* is a narrow pyramid. The flowerhead ranges from 5–12 cm long for both subspecies. Glumes are purplish, bronze, or greenish, and smooth to rough along the raised keel. Glumes are equal in length and about the same length as the first flower. The lemma has a long, straight awn attached below the middle and extending to equal the glumes. The callus hairs are unequal and 1/2 to 3/4 as long as the lemma.
Habitat: Slimstem Reedgrass grows on silty alkaline soils, around lakeshores, and in open forests. In the Columbia Basin region subspecies *inexpansa* appears to be the most common and occurs at Lardeau, Radium, Valemont, and Field (to name a few locations). Subspecies *stricta* has been collected only at Lavington Creek. Douglas et al. (1994), state that subspecies *inexpansa* and subspecies *stricta* are common east of the Coast-Cascade Mountains.
Similar Species: Subspecies *inexpansa* differs from subspecies *stricta* by its taller and more robust growth. The leaf blades of subspecies *stricta* are stiffer. The awn of the lemma usually extends slightly beyond the tip of the glume in subspecies *inexpansa*.

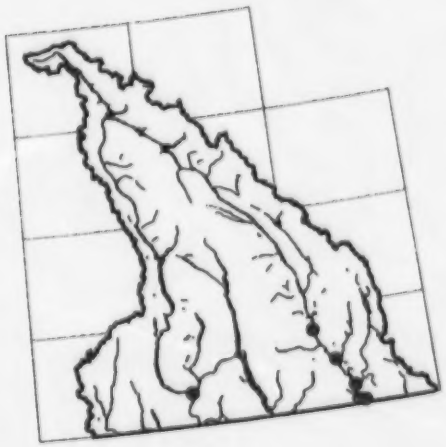


This North American genus has five species and resembles *Calamagrostis* superficially. Differing ligule types (in *Calamagrostis* it is membrane-like compared to a ring of short hairs in *Calamovilfa*) can be observed with a hand lens. *Calamovilfa* has some value as a forage grass for horses, and with the stout rhizome it is a good soil stabilizer, especially in sand.

Calamovilfa longifolia (Hook) Scribn. var. ***longifolia***
Prairie Sandgrass

Plant: *Calamovilfa longifolia* is a native species that grows 60–150 cm tall. It is a coarse, strongly rhizomatous perennial. The flowerhead is 40 cm long and narrow to open.
Leaves and Stem: The open sheaths are smooth to soft-hairy, and the hairs at the sheath throat are 2–3 mm long. The less-than-1-mm-long ligule consists of a ring of short hairs. The inrolled leaf blades are 3–8 mm wide, and have long, slender tips.

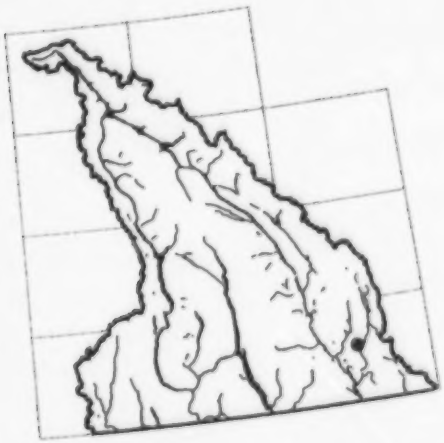
Flowerhead and Flowers: The flowerhead is 40 cm long and narrow to open. Spikelets are pale green or purplish. The notably unequal glumes are 4.5–7 mm long, and extend into long, sharp points. The smooth lemma is midway in length between the two glumes and may be sharp-pointed to blunt. The callus is very hairy.
Habitat: Prairie Sandgrass grows on dry, sandy sites in the steppe and lower montane zones. In the Columbia Basin region, Prairie Sandgrass occurs at Tobacco Plains, Wasa Lake, and Bull River, and along the Kootenay River. The Waldo site recorded in the Royal BC Museum database is now under water.
Similar Species: *Calamovilfa* can appear to resemble *Calamagrostis*, but the ligules of *Calamovilfa* consist of short hairs, whereas the ligules of *Calamagrostis* are membrane-like.



This genus has seven species in Northern Eurasia compared to one species in North America. Though palatable, it grows primarily in aquatic habitats and is too infrequent or difficult to harvest to be an important forage grass.

Catabrosa aquatica (L.) Beauv.
Water Hairgrass

Plant: *Catabrosa aquatica* is a native species that grows 10–60 cm tall. It is an aquatic perennial with a creeping or slightly bent base. The open flowerhead is pyramid-shaped with small blunt-looking spikelets, and one or two flowers in each spikelet.
Leaves and Stem: Sheaths are open to 1/2 their length or closed for their full length. Flat leaves are 2–13 mm wide and the tips are prow-like (similar to *Poa* species). The ligules are 2–8 mm long and hairy to smooth along the upper edge. There are no auricles.
Flowerhead and Flowers: The open flowerhead is 7–20 cm long with one or two flowers to each spikelet. The blunt, ragged-edged glumes are shorter than the flowers, nerveless, and membrane-like. The lemmas are unawned and prominently nerved, and the nerves do not converge at the tip of the lemma.
Habitat: Water Hairgrass grows in moist meadows and along lakeshores and streambanks in the montane zone. Water Hairgrass has been found only in one location near Fernie. It is a Red-listed species by the B.C. Conservation Data Centre (Douglas et al. 1998).
Similar Species: In British Columbia, Water Hairgrass occurs at the northwestern limit of its range, and there are no species that it closely resembles.



Cinna has three species in the Americas, and, although palatable, it occurs in amounts too small to be of value as forage.

Cinna latifolia (Trevir.) Griseb.
Nodding Woodreed

Plant: *Cinna latifolia* is a native species that grows 60–200 cm tall. It is a perennial with rhizomes and a nodding flowerhead.
Leaves and Stem: The base of the stem is sometimes bulbous. The soft, thin leaves are 7–15 mm wide in the middle and narrow abruptly to a sharp tip. The leaves stand at right angles to the stem. The sheaths are open, and there are no auricles. Ligules are 3–8 mm long and hairy, and often have a tattered edge. This species is sweetly scented.
Flowerhead and Flowers: The flowerhead is open, drooping, and 15–30 cm long. One-flowered spikelets hang from the ends of the drooping branches. The narrow glumes are strongly keeled and about the same size. The strongly flattened lemma is about the same length as the glumes, and may or may not have a short awn. Spikelets break off at the base of the glumes—not above the glumes as in many grasses—leaving behind naked branches at maturity.
Habitat: Nodding Woodreed grows in moist meadows and woods, and along streams, especially in disturbed sites. This species occurs in the Columbia Basin region along the Bull River, in Mount Revelstoke National Park, and in Yoho National Park.
Similar Species: The tall stature, drooping flowerhead, and wide leaves distinguish this species clearly.

This small genus from Eurasia has two spikelet forms: a sterile form (which can have a distinctive fan-like shape) and a fertile form. Two species occur in British Columbia, *Cynosurus echinatus* and *C. cristatus*. Though not collected from the Columbia Basin region, *C. cristatus* is sometimes cultivated and may show up in the future.

Cynosurus echinatus L.
Hedgehog Dogtail

Plant: *Cynosurus echinatus* is an introduced species that grows 20–50 cm tall. It is a clump-forming, hairless annual with spiky, elongate to egg-shaped heads.

Leaves and stem: The flat leaves are 2–5 mm wide and distributed along the stem. The open leaf sheaths are loose and enlarged. There are no auricles, and the prominent ligules extend from 2 to 7 mm and are rounded and ragged at the tip.

Flowerhead and Flowers: The bristly flowerheads appear unbranched with the spikelets tightly grouped into a spike-like to somewhat rounded head. Spikelets occur mostly in pairs, with the sterile spikelet modified into a flattened, bristly fan. The other spikelet is fertile with two shortly awned, nearly equal glumes. The two flowers of the fertile spikelet have lemmas with long, pointed awns. These awns may reach 10 mm and stick out well beyond the glumes.

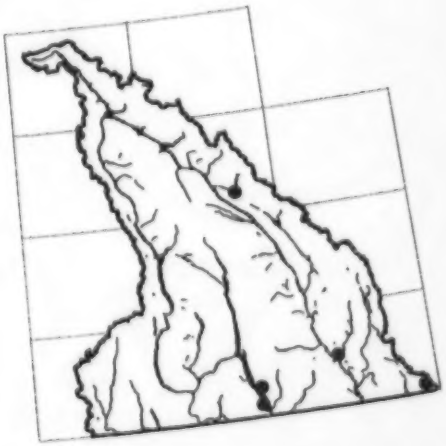
Habitat: Hedgehog Dogtail occurs in meadows, clearings, and open coniferous woodlands. It grows along the shoreline of Kootenay Lake.

Similar Species: Hedgehog Dogtail has distinctive pairs of spikelets, with one sterile and the other fertile. It should not be confused with any other species.

The Latin name for Orchard Grass—*Dactylis*—derives from the Greek *daktulos*, which means finger, in reference to the stiff branches of the flowerhead. Orchard grasses come from the Old World and are cultivated in hay mixtures. *Dactylis* can become weedy and is thought by many ecologists to be displacing native species. On the plus side, *Dactylis* provides high-value forage for cattle and deer populations.

Dactylis glomerata L.
Orchard Grass

Plant: *Dactylis glomerata* is an introduced species that grows to 1.5 m tall. It is a robust, clump-forming perennial with a slightly branched asymmetrical flowerhead with clustered spikelets.
Leaves and Stem: Stout, erect, hollow stems arise from a dense mass of rank leaves and grow from short rhizomes that are often difficult to see. The sheaths are open part way. The hairless but rough-feeling leaf blades are 3–11 mm wide and flat. Young growth is bluish green. There are no auricles. The ligules are 3–9 mm long and hairy. The upper half of the ligule may be turned back and split in several spots.
Flowerhead and Flowers: The somewhat one-sided, slightly pyramid-shaped flowerhead is 3–15 cm long and can be recognized even in dry winter specimens. Spikelets are crowded on the ends of short, stiff branches. Flattened spikelets bear three to five flowers, which extend somewhat beyond the glumes. Glumes are about equal in length and are shorter than the first flower. Glumes have short awns, and one of the glumes is hairy in the upper portion. Lemmas likewise have short awns and hairs on the upper part.
Habitat: Orchard Grass is a widespread, weedy species of roadsides, fields, and disturbed sites. In the Columbia Basin region it grows around Kootenay Lake, along Akamina Creek, at Wardner, and at Creston. It is sometimes used in seed mixtures planted after a serious burn (G. Berg, pers. comm., 1999).
Similar Species: Orchard Grass might be confused with Reed Canary Grass (*Phalaris arundinacea*), another tall, robust grass. Reed Canary Grass generally grows much taller, usually in seasonally wet sites. Its leaves are wider and the flowerhead is narrowed and pointed.

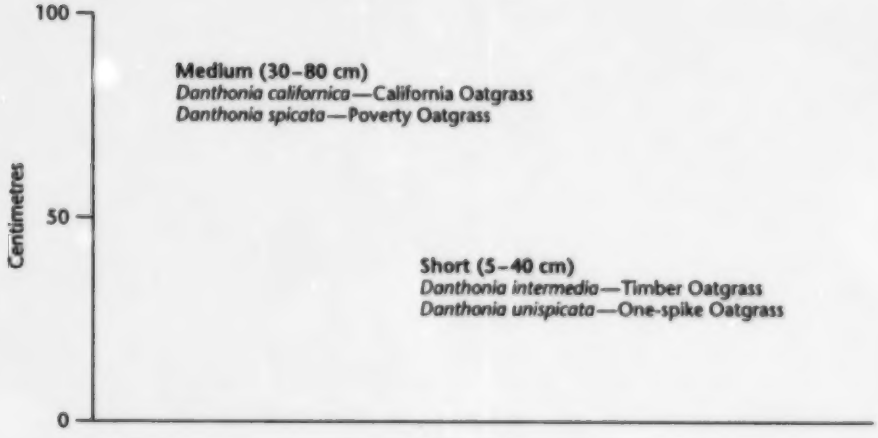


Four species of the distinctive Oatgrass occur in the Columbia Basin region. Generally, these tufted perennials grow to a low to medium height (less than 80 cm). Oatgrasses have narrow, flat to inrolled leaves, no auricles, and a fringe of hairs where the ligule should be. The spikelet separates *Danthonia* from most other genera. As with many other members of the Oat tribe to which *Danthonia* belongs, the prominent rounded to keeled glumes are mostly longer than the flowers (except in *Danthonia californica*). The flattened, bent (not in immature specimens), and sometimes twisted awn is an obvious diagnostic character. The awn arises in a depression between two long teeth from the back near the tip of the lemma. Spikelets break apart above the glumes. Important features to note when trying to identify the species are whether the sheaths are hairy or not, whether the flowerhead is open or spike-like, and whether the back of the lemma is hairy or not.

***Danthonia*—Adapted from Douglas et al. (1994)**

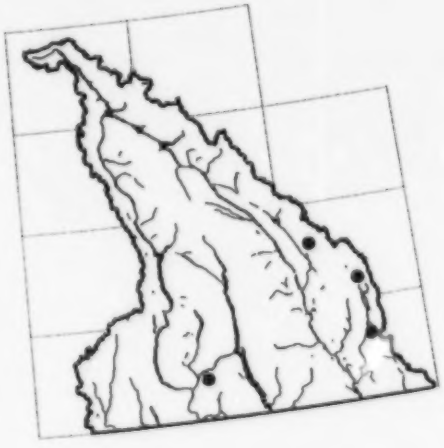
1a. Lemma length less than 6 mm; lemmas more or less hairy over the back as well as along the edge ..... *Danthonia spicata*
1b. Lemma length greater than 6 mm; lemmas smooth over the back 2
2a. Flowerhead branches spreading at right angles; lower branches as long as or longer than the spikelets..... *Danthonia californica*
2b. Flowerhead branches pressed close to the axis; lower branches shorter than the spikelet length 3
3a. Lower branch with more than one spikelet. . . .. *Danthonia intermedia*
3b. Lower branch with only one spikelet ..... *Danthonia unispicata*

Heights of *Danthonia* species



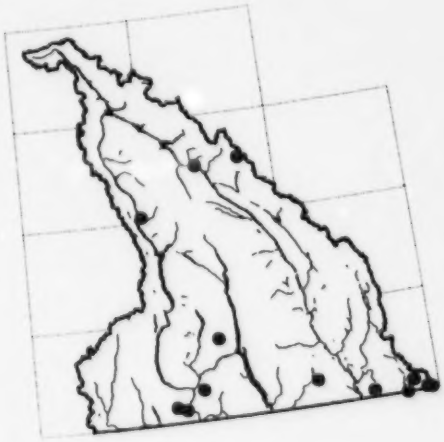
***Danthonia californica* Boland.**
California Oatgrass

Plant: *Danthonia californica* is a native species that grows 30–80 cm tall. It is a tuft-forming perennial with an open, branched, few-flowered flowerhead.
Leaves and Stem: Leaves occur at the base and along the stem. Sheaths are hairy and open. Flat to inrolled leaf blades are 1.5–3 mm wide. The ligule is less than 1 mm long and consists mostly of hairs. Auricles are absent.
Flowerhead and Flowers: The sparse flowerhead has two to five spikelets, one each at the ends of the branches, which are as long or longer than the spikelets. The glumes are 14–18 mm long, nearly equal in length, and extend into an awn-like point. Except for the long, bent awn, the first flowers are enclosed in the glumes. However, the remaining four to seven flowers usually stick out beyond the tips of the glumes. Lemmas are largely without hairs, except at the base and margins.
Habitat: California Oatgrass grows on sandy and rocky ridges, lakeshores, and coastal meadows. In the Columbia Basin region it grows at Copper Mountain, Fording Lookout, Marysville, and Albert Creek.
Similar Species: California Oatgrass resembles Timber Oatgrass (*Danthonia intermedia*), but California Oatgrass has spreading branches and hairy leaf sheaths, whereas Timber Oatgrass has erect branches and smooth leaf sheaths. The few-flowered stalk arising from a tuft of narrow leaves, and the flattened, twisted awns from between two teeth at the tip of the lemma are diagnostic characters for the *Danthonia* genus.



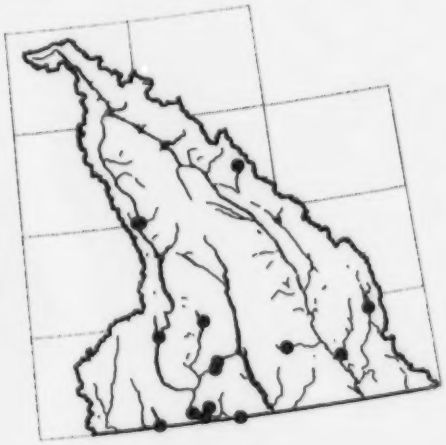
Danthonia intermedia Vasey
Timber Oatgrass

Plant: *Danthonia intermedia* is a native species that grows 5–40 cm tall. This perennial forms dense tufts with erect stems and spiky flowerheads.
Leaves and Stem: The leaf blades are 2–4 mm wide, flat to inrolled, and erect to curved, and grow mostly at the base where old leaves persist. The leaf blades are especially hairy where they meet the stem. Sheaths are smooth to sparsely hairy and open. The ligules are hardly present, being made of short hairs. Auricles are absent.
Flowerhead and Flowers: The flowerhead is narrow and 3–6 cm long, and often appears to have the spikelets arranged to one side. Each side branch has one (occasionally two) spikelet with few flowers. The glumes are 13–17 mm long, about equal in length, and enclose most of the several flowers. Lemmas are hairy at the base and along margins. A 10-mm-long, generally bent and twisted awn emerges from between two teeth at the tip of the lemma.
Habitat: Timber Oatgrass grows in dry to moist, gravelly and rocky sites such as slopes, beaches, meadows, and openings in woods. In the Columbia Basin region it occurs at Waitabit Creek, Flathead River, Grizzly Gulch, and Old Glory Mountain.
Similar Species: Timber Oatgrass is similar to California Oatgrass. See the Similar Species description for California Oatgrass (*Danthonia californica*). Futher differences between the two species are: the glumes of Timber Oatgrass are longer than all of its flowers, and the flowers are rarely visible, whereas in California Oatgrass the upper flowers on the axis extend slightly beyond the glumes.



Danthonia spicata (L.) Beauv. ex R. & S.
Poverty Oatgrass

Plant: *Danthonia spicata* is a native species that grows 20–70 cm tall. It is a strongly tufted perennial with strongly curved to curled old basal leaves and a small, narrow flowerhead with the spikelets tending to one side.
Leaves and Stem: The leaves mostly form a dense mass at the base, though some are scattered along the stem. Old basal leaves are curved to strongly curled. The leaf blades are 0.5–2.0 mm wide and inrolled. Sheaths are open and smooth to slightly hairy with especially long hairs at the throat and in the collar. The ligule of hairs is scarcely 0.5 mm high, and there are no auricles.
Flowerhead and Flowers: The narrow, spiky flowerhead is only 2–5 cm long and secund. The very short branches have one or two spikelets. The slender glumes are about equal in length and both are longer than the flowers (excluding the awn). The lemmas are 4–5 mm long and sparsely hairy on the back, and bear two long, prominent teeth at the tip. An 8- to 9-mm-long flattened awn arises between the teeth. The awn is often twisted and bent, and sticks out of the spikelet.
Habitat: Poverty Oatgrass grows in dry, stony sites, in dry meadows, and along lakeshores. In the Columbia Basin region it is widespread and grows at New Denver, Nelson, Moyie, Bull River, and Yoho National Park (to name a few locations).
Similar Species: Poverty Oatgrass differs from other Oatgrass species because it has a lemma that is less than 6 mm long, and hairy on the back and margins—not hairy just on the margins. Sometimes the lemmas may be up to 7 mm long, but their backs are at least sparsely hairy.



Danthonia unispicata (Thurb.) Munro ex Macoun
One-spike Oatgrass

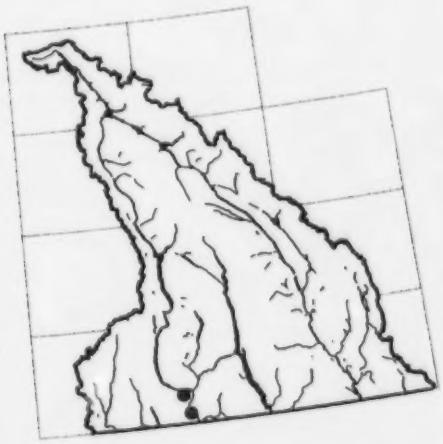
Plant: *Danthonia unispicata* is a native species that grows 10–30 cm tall. It is a tufted perennial with generally straight basal leaves, and a small, narrow flowerhead of one spikelet.

Leaves and Stem: The leaves form a tufted mass at the base and are scattered along the stem. Basal leaves are straight to curved. Leaf blades are 1.0–4.0 mm wide and flat to inrolled. Sheaths are open and usually obviously hairy with especially long hairs at the throat and on the collar. The long, white hairs stick out at right angles to the sheath. The ligule of hairs is scarcely 0.5–1 mm high and there are no auricles.

Flowerhead and Flowers: The small, spiky flowerhead usually consists of a single spikelet (rarely more) and is about 1–3 cm long. The first glume is slightly shorter than the second and both are taller than the flowers (excluding the awn). The lemmas are 9–12 mm long and smooth on the back with hairs along the margin and perhaps at the base. They bear two prominent teeth at the tip. A flattened awn arises between the teeth. The awn is often twisted and bent, and sticks out of the spikelet.

Habitat: One-spike Oatgrass grows in dry to moist prairies, slopes, and ridges at low to mid elevations. There are only two records for One-spike Oatgrass from the Columbia Basin region in the Royal BC Museum's database: these are from Trail and Castlegar.

Similar Species: One-spike Oatgrass differs from other Oatgrass species because it usually has a single spikelet in a spike-like flowerhead. Compared to Poverty Oatgrass, it has much longer lemmas (9–12 mm vs less than 6 mm) that are smooth, not hairy, on the back.



The genus is named after the French botanist Jean Deslongchamps (1774–1849). The species in this genus are all perennial except for the annual *Deschampsia danthonioides*. *Deschampsia* species were once included in *Aira*, but that genus is now agreed upon to include only delicate annuals of which there are two species in North America. Cody (1996) separates the two genera on characters such as whether the length of the glume is shorter than the spikelet (as in *Deschampsia*) or is equal to or exceeds the uppermost flower (as in *Aira*).

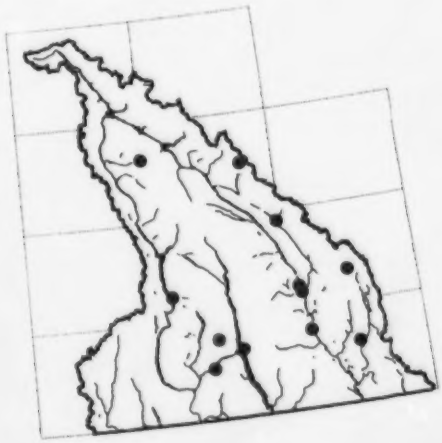
***Deschampsia*—Adapted from Douglas et al. (1994)**

1a. Plants annuals ..... *Deschampsia danthonioides*
1b. Plants perennials; plants densely tufted **2**
2a. Leaves flat or slightly inrolled and 1.5–4 mm wide... ..... *Deschampsia cespitosa*
2b. Leaves narrow and less than 1.5 mm wide ..... *Deschampsia elongata*

Deschampsia cespitosa (L.) Beauv.
Tufted Hairgrass

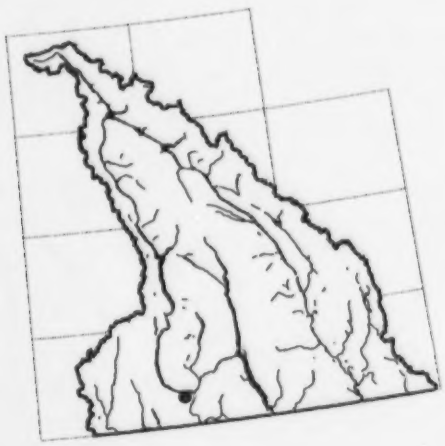
Plant: *Deschampsia cespitosa* is a native species that grows 20–120 cm tall. It is a strongly tufted perennial with several stems from each tuft. The loose, open flowerhead appears shiny and can have purplish to tawny-coloured spikelets.
Leaves and Stem: The open sheaths range from smooth to rough to the touch. The ligules are 4–8 mm long, hairy, pointed to blunt, and often split. The leaves are matted at the base and often stiff. The leaf blades are flat or rolled inward and 1.5–4 mm wide. The leaf veins are raised. There are no auricles.
Flowerhead and Flowers: The loose, open flowerhead is 8–25 cm long and has branches that spread or droop or that may be pressed close to the stem axis. The flowerhead appears shiny and can have purplish to tawny-coloured spikelets. The nearly equal glumes are narrow and longer than the flowers. The lemmas are ragged along the upper tip and 2.5–5 mm long, and have callus hairs at the base that are 1 mm long. The 2.5- to 4-mm-long awn is attached near the base of the lemma.

Habitat: Tufted Hairgrass grows in moist meadows and on rocky ridges in the montane to alpine zones. In the Columbia Basin region it is widespread at higher elevations and has been collected at Goldstream Mountain, Nakusp, Yoho National Park, Nelson, Crawford Bay, and Canal Flats (to name a few locations).
Similar Species: The features of Tufted Hairgrass vary considerably and some authors have described several varieties. Douglas et al. (1994) have described two subspecies: *beringensis* and *cespitosa*. Subspecies *beringensis* occurs in saline meadows and tidal marshes. Subspecies *cespitosa* occurs east of the Coast-Cascade Mountains in the montane to alpine zones. The glumes of subspecies *cespitosa* are less than 5 mm long, and the branches of the flowerhead are pressed toward the stem axis at maturity. Subspecies *beringensis* has longer glumes and an open (spreading branches) flowerhead at maturity.



Deschampsia danthonioides (Trin.) Munro ex Benth.
Annual Hairgrass

Plant: *Deschampsia danthonioides* is a native species that grows 5–50 cm tall. It is a simple, tufted annual with thin leaves and a narrow, erect flowerhead.
Leaves and Stem: One to several stems arise from a few leaves at the base. Sheaths are open. The leaf blades are 1–1.5 mm wide, usually inrolled and concentrated at the base. The ligules are 3–6 mm long and somewhat pointed. There are no auricles.
Flowerhead and Flowers: The flowerhead varies from narrow to spreading, and is up to 25 cm long. Spikelets are generally two-flowered. The two nearly equal, relatively long glumes are longer than the upper flower. Lemmas are firm, smooth, shining, purplish, and about 2.5 mm long. A bent awn extends from the middle of the back of the lemma.
Habitat: Annual Hairgrass grows on dry slopes, by roadsides, and beside vernal (spring) pools. In the Columbia Basin region it occurs in Castlegar.
Similar Species: Its annual growth habit distinguishes Annual Hairgrass from other species.



Deschampsia elongata (Hook.) Munro ex Benth.
Slender Hairgrass

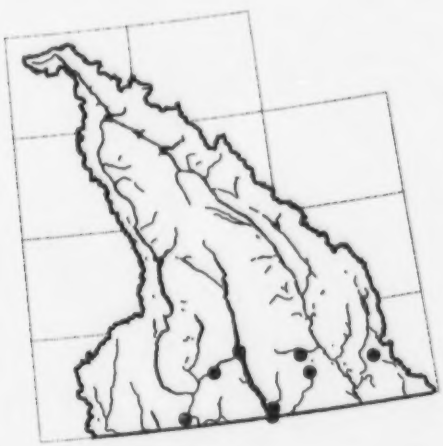
Plant: *Deschampsia elongata* is a native species that grows 25–80 cm tall. It is a tufted perennial with numerous stems and a narrow, pale green to purple flowerhead.

Leaves and Stems: The open sheaths are smooth and auricles are absent. The ligules are 3–9 mm long and pointed, and have a smooth edge, unless torn during the emergence of the flowerhead. The leaves usually occur as a basal tuft and the basal leaves are hair-like. Leaves along the stem are flat or in-rolled, but rarely over 1.5 mm wide.

Flowerhead and Flowers: The narrow flowerhead has slender upward-pointing branches, and is pale green to purple. The nearly equal, pointed glumes are equal to, or exceed the upper flower in length. The blunt-tipped lemmas are firm, smooth, and shining. The blunt upper tip has a ragged edge. The lemma awn is attached just below the midpoint and is 3–4 mm long and nearly straight. The bearded callus has hairs that are 1/2 as long as the lemma.

Habitat: Slender Hairgrass grows on moist slopes, along streambanks, and in open forests from the lowland to alpine zones. In the Columbia Basin region it occurs at Nelson, Rossland, Rykerts, Kootenay Bay, Marysville, and Lumberton.

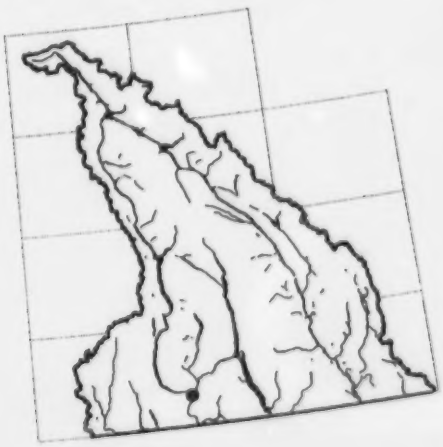
Similar Species: Slender Hairgrass resembles Tufted Hairgrass, but Slender Hairgrass has fine, hair-like leaves rather than flat leaves.



This genus of mostly tropical species is well known for its weedy species. The name originates from the Latin word *digitus*, for finger, in reference to the finger-like segments of the flowerhead.

Digitaria sanguinalis (L.) Scop.
Hairy Crabgrass

Plant: *Digitaria sanguinalis* is an introduced species that grows to 30 cm tall. It is a freely branching, spreading perennial with an open flowerhead with finger-like branches. These branches give the flowerhead a hand-like look.
Leaves and Stem: The lower parts of stems tend to creep along the ground before becoming erect, and may form patches up to a metre across. Sheaths are open and covered in long sparse hairs. Leaf blades are flat, 4–7 mm wide, and hairy toward the base. Ligules are 1.5–2 mm long and truncated at the tip. Leaf margins are turned upward near the base and join the ligule as slight ridges. The collars of the leaf blade/sheaths have long hairs. There are no auricles.
Flowerhead and Flowers: The flowerheads are 5–12 cm long and open, and have numerous narrow finger-like branches that usually occur in whorls. The spikelets have two flowers but the lower flower is usually sterile. The spikelets are arranged along one side of the branch of the flowerhead. There is only one obvious shield-like glume, with the second glume missing or tiny. The glume is more or less as long as the spikelet. The greenish brown lemma of the fertile flower is smooth and hard.
Habitat: Crabgrass was introduced from Europe but remains an infrequent species in British Columbia. It occurs along roadsides, on disturbed sites, and in lawns. In the Columbia Basin region, there is a single record of this species at Castlegar.
Similar Species: The finger-like branches and obvious weedy habitat preference of Crabgrass make this species unmistakable.



The leaves of the species in this genus form two ranks or rows—and the Greek word for two-ranked is *distichos*—hence the name. These grasses of the Americas are wiry and well adapted to saline and alkaline soils.

Distichilis spicata (L.) Greene var. ***stricta*** (Torr.)
Beetle Alkali Saltgrass

Plant: *Distichilis spicata* is a native species that grows 10–40 cm tall. It is a wiry, spreading, and sod-forming perennial with a solid stem and scaly rhizomes, more or less erect leaves arranged in two distinct rows, and a spiky-looking flowerhead.
Leaves and Stem: Sheaths are open and there are long hairs on the collars and sheath edges. Leaves are narrow and 2–4 mm long, and stand erect in two rows. There are no auricles. The ligules are 0.5 cm long and fringed with long hairs. The species is easy to recognize even in the winter because the leaves, though dry, remain attached.
Flowerhead and Flowers: The flowerhead is a small, compact spike, carried only slightly above the many-stemmed leaves. Large, flattened, and overlapping spikelets contain about five flowers. The two glumes are of different sizes, with the longest shorter than the first lemma. Lemmas are hardened but have no awns. Male and female flowers are on separate plants.
Habitat: Alkali Saltgrass grows along sandy lakeshores and in moist alkaline sites. In the Columbia Basin region, this species grows at Doyle, Marysville, Findlay Creek,Windermere Lake, and Columbia Lake.

Similar Species: There are two varieties of Alkali Saltgrass in British Columbia, and the habitat is important in determining which variety you are looking at. If you are in the Columbia Basin region it is variety *stricta*; if you are along the coast at a tidal shore you have variety *spicata*.

The word *Elymus* is believed to have come from the Greek word for millet, a type of grain. The genus *Elymus* contains species that are all perennial, and have spikelets born singly or occasionally in pairs (up to four in *E. canadensis*) along an elongated axis. In past interpretations, the genus was thought to consist of species in which the spikelets fell off the axis at maturity, but now the genus also includes species with the central axis breaking apart at maturity. Spikelets are laterally flattened and the first glume is usually 1/2 the length of the lowest lemma. The lemmas are rounded on the back or keeled only at the tip. The genus *Elymus* has been at the centre of taxonomic controversy due in part to the rearrangement of the species in the related genus *Agropyron*, a genus in the Wheatgrass tribe. For many years, grass taxonomists had arranged taxa according to species that were recognized from Europe, and these were compared to what was native to North America. In the last 50 years a great deal of taxonomic work has been done in Russia, Asia, and China, and the implication of this work is that a number of species in North America are similar to larger genera that are common in these countries. Initially, in moving species out of the *Agropyron* genus, some were placed in the *Elymus* genus because of similarities to that group. In other instances, species were put in new and unfamiliar groups to reflect the global taxonomy. One species that has been part of this taxonomic musical chairs is *Elymus repens* (Quackgrass). *E. repens* is widespread and well known, but it has a rocky taxonomic history. Hitchcock (1951) placed it in the genus *Agropyron*. Subsequently, it was moved to *Elymus* and then to *Elytrigia* to reflect the similarities to other species of *Elytrigia* in Russia, and now it has been moved back to *Elymus* (M. Barkworth, pers. comm., 1999). In this treatment, *Elymus spicata* is called *Pseudoroegneria spicata*, to reflect recent changes. These species are not renamed on a whim, but reflect new information from treatments in new floras and an increased understanding of the genetics and population dynamics of grasses.

***Elymus*—Adapted from Barkworth (1999)**

1a. One spikelet at each node but occasionally paired at the lowest nodes . . . 2
  2a. Plants tufted, short or no rhizome 3
    3a. Glumes widest at or above the middle 4
      4a. Glumes widest near the tip with transparent margins more than 0.5 mm wide; glumes smooth . . . . . *Elymus alaskanus*
      4b. Glumes widest at the middle with transparent margins about 0.3 mm wide; glumes rough . . . . . *Elymus trachycaulus*
    3b. Glumes linear to lance-shaped with transparent margins 0.1–0.2 mm wide . . . . . *Elymus glaucus*
  2b. Plants with strong rhizomes 5
    5a. Glumes strongly keeled . . . . . *Elymus repens*
    5b. Glumes weakly keeled or with no keel at all . . . . *Elymus lanceolatus*
1b. Two to five spikelets at each node 6
  6a. Central axis of the flowerhead disintegrates at maturity . . . . . *Elymus elymoides*
  6b. Central axis of the flowerhead does not disintegrate at maturity 7

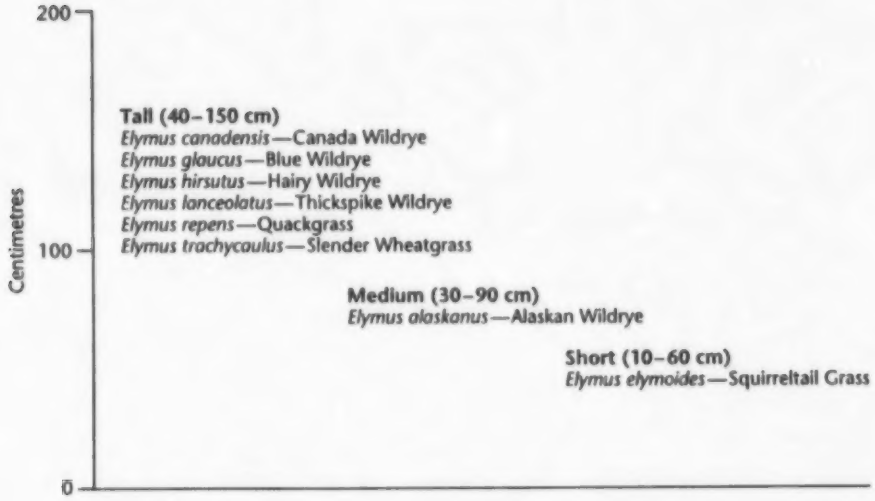
7b. Edges of glumes not transparent ..... *Elymus canadensis*

7a. Edges of glumes transparent 8

8a. Lemmas have hairs along veins with longest hairs along edges, and awns curve slightly outward; spikes flexous. . . .. *Elymus hirsutus*

8b. Lemmas smooth or with very sparse short hairs; awns straight; spikes straight ..... *Elymus glaucus*

Heights of *Elymus* species



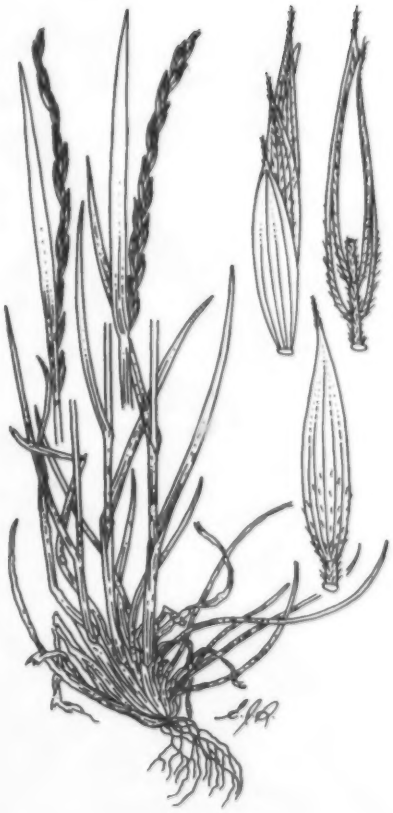
Elymus alaskanus (Scribn. & Merr.) A. Love
Alaskan Wildrye

Plant: *Elymus alaskanus* is a native species that grows 30–90 cm tall. It is a tufted perennial with short hairs on the stem nodes, and an erect, moderately dense flowerhead.

Leaves and Stem: Smooth sheaths are open to the base. The ligules are less than 0.5 mm long and hairy. The auricles, if they are present, are slender and rarely over 1 mm long. The leaf blades are 2–5 mm wide and flat or slightly inrolled, and have scattered hairs.

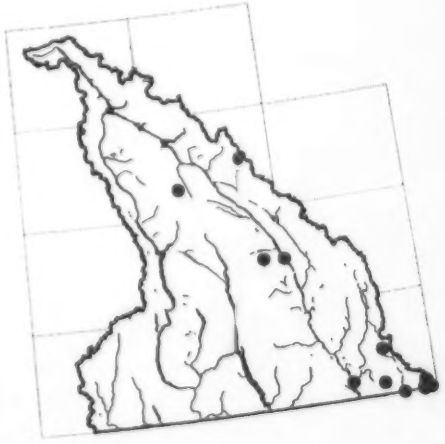
Flowerhead and Flowers: The flowerhead is a terminal spike about 8–11 cm long and 0.5 cm wide. This is an important visual characteristic when distinguishing the two subspecies. The spikelets are single at each node and have four to six flowers. The equal glumes are oblong or broadly lance-shaped, 5–8 mm long, rough-hairy, and transparent along the edges. The glumes are as long as the first flower and sometimes slightly longer, and can have less than 1-mm-long awns at the tip. The lemma has short hairs toward the tip and has a 1-mm-long awn.

Habitat: Alaskan Wildrye grows in moist to dry sites and is widespread. In the Columbia Basin region it occurs commonly throughout the region and can be found growing at Windermere, along the Flathead River, and on Limestone Ridge.



Similar Species: Alaska Wildrye resembles Slender Wheatgrass (*Elymus trachycaulus*) except that Alaska Wildrye has the widest part of the glumes near the tip and the glume veins are smooth, whereas Slender Wheatgrass has the widest part of the glume near the middle, and the glume veins are rough. This is a character best determined with a hand lens or under a dissecting microscope. Alaska Wildrye has several subspecies in British Columbia, but only two that are found in the Columbia Basin region: *latiglumis* and *alaskanus*.

About the subspecies level, there is some debate among taxonomists whether subspecies *latiglumis* should be placed in *E. alaskanus* subspecies *latiglumis* or in *E. trachycaulus* subspecies *latiglumis*. M. Barkworth (pers. comm. 1999) feels that the subspecies *latiglumis* is better placed in the *E. alaskanus* group. This subspecies is sometimes noted as the *Latiglumis/violaceus* group, and it includes what was once called *Agropyron violaceum*.



***Elymus canadensis* L.**
Canada Wildrye

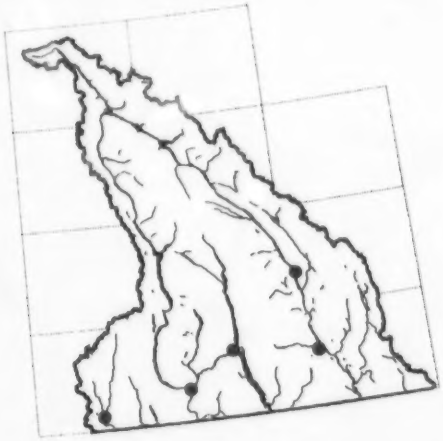
Plant: *Elymus canadensis* is a native species that grows to 150 cm tall. It is a loosely tufted plant with two spikelets to a node, and a dense, erect flowerhead that is sometimes slightly drooping, and has long, sometimes bent, awns.

Leaves and Stem: The mostly smooth sheaths are open to the base. The auricles are usually well developed. Ligules are 0.5–1.5 mm long and finely hairy. The leaves are coarse, arranged along the stem, and 5–15 cm wide, and may feel smooth to slightly rough to the touch.

Flowerhead and Flowers: The spike-like, dense flowerhead is up to 20 cm long and sometimes droopy. There is more than one spikelet at each node and the lower spikelets barely overlap, whereas the upper ones overlap. Glumes are narrow, strongly nerved and broadest below the midpoint, sometimes appearing rounded and sometimes slightly flattened. The glume awn is as long as the body of the glume. Glumes are of equal length. Their body is shorter than the first flower. The strongly nerved lemma has short, dense hairs across the back. The awn curves or arches, and feels rough to the touch. It is twice as long as the body of the lemma, reaching up to 35 mm in length.

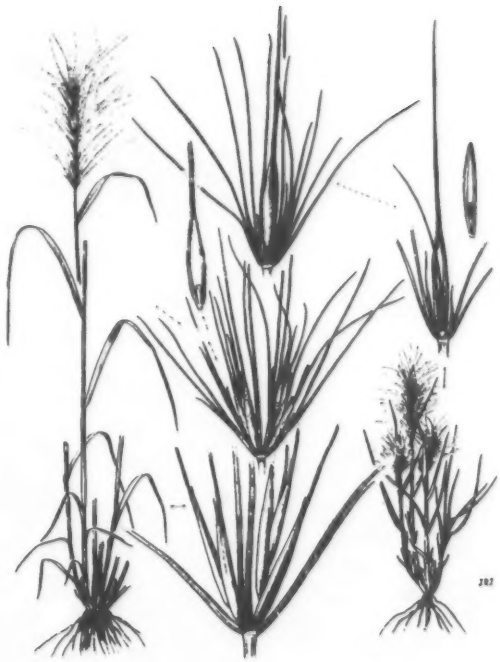
Habitat: Canada Wildrye occurs in moist to sandy meadows, disturbed roadsides, and gravelly riverbanks. It grows in the Columbia Basin region at Cranbrook, Windermere, and Queen's Bay.

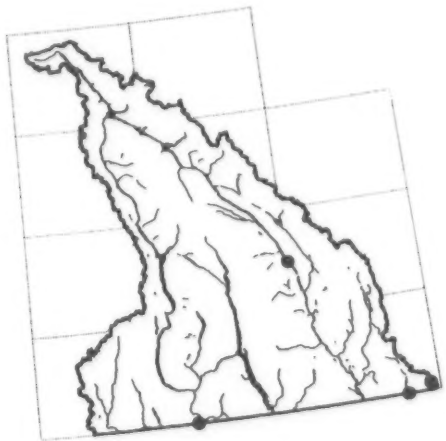
Similar Species: Within the genus *Elymus* there is a split between those species that have one spikelet per node and those that have two or more spikelets per node. Canada Wildrye can have up to four spikelets per node, but this number varies from plant to plant and even on individual plants; consequently, you should check several nodes before making the decision about how many spikelets are at each node. Blue Wildrye (*Elymus glaucus*), resembles Canada Wildrye in that it has more than one spikelet per node, but they differ in that the spikelets of Blue Wildrye are narrower than those of Canada Wildrye.



Elymus elymoides (Raf.) Swezey
Sitanion hystrix (Nutt.) J.G. Smith
Squirreltail Grass

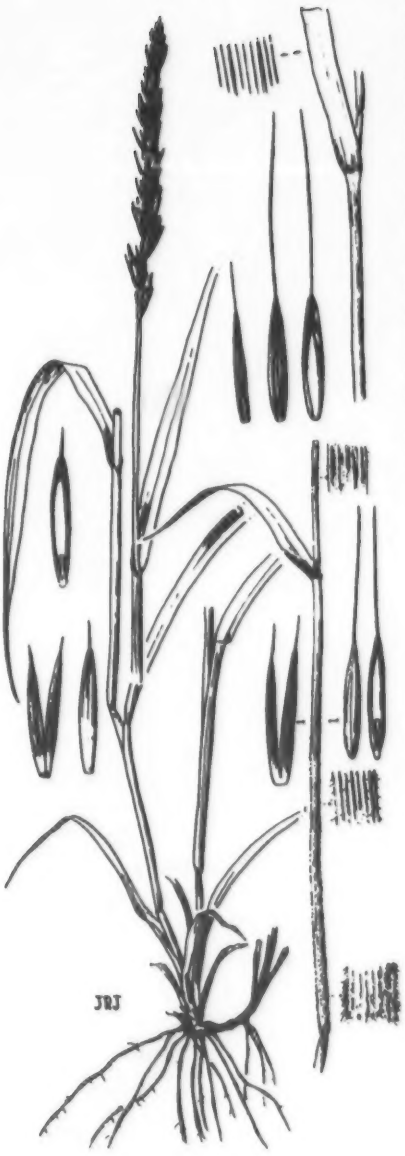
Plant: *Elymus elymoides* is a native species that grows 10–60 cm tall. It is a densely tufted perennial bearing a long, bristly, spike-like flowerhead.
Leaves and Stem: The sheaths are open to the base and the auricles are lacking on some plants and less than 1 mm long on others. The short ligule can be thin with a transparent membrane, or have short hairs and barely reach 0.5 mm high. Leaf blades are flat to folded and inrolled, and 1–4 mm wide.
Flowerhead and Flowers: The spike remains partially enclosed in the uppermost sheath, which explains the large length range (3–15 cm). The rachis breaks apart at maturity. Spikelets are commonly two per node, but rarely one or three, so check several specimens. The narrow glumes are awl-shaped, tapering to a sharp point or into one or two 3- to 10-cm-long awns. The glumes are more or less equal and are shorter than the body of the first flower. The lemma is rough to short-hairy with the main nerve and the two lateral nerves extending into awns that are longer than the glume.
Habitat: Squirreltail Grass grows on dry to moist sites from open grassland to open forest at all elevations. In the Columbia Basin region it occurs in the Flathead area and along the Upper Columbia River.
Similar Species: The flowerhead of Squirreltail Grass takes a range of forms. Sometimes it resembles *Elymus* characters with two spikelets and four glumes per node. Other specimens have sterile flowers so there appear to be many glume-like spikelets. Douglas et al. (1994) describe two subspecies of Squirreltail Grass—*Elymus elymoides* ssp. *californicus*, with entire glumes that have awns shorter than the lemma awns, and *Elymus elymoides* ssp. *elymoides* that has two teeth at the tip of the glume. In subspecies *elymoides*, the glume awns are longer than the lemma awns.

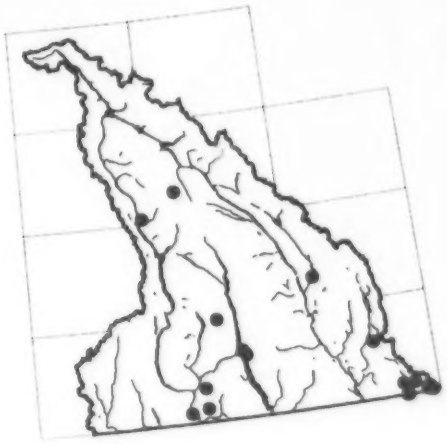




Elymus glaucus **(Raf.) Buckl.**
Blue Wildrye

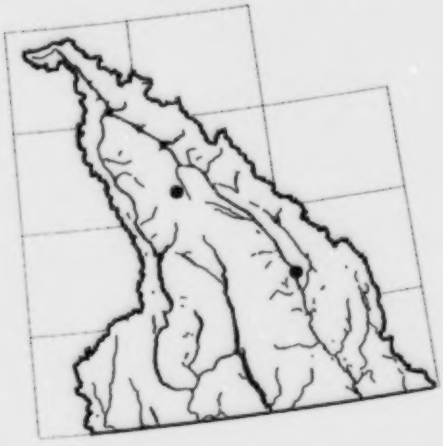
Plant: *Elymus glaucus* is a native species that grows 50–120 cm tall. It is a stiff-stemmed and tufted perennial with a long, slender, spike-like flowerhead.
Leaves and Stem: The sheaths are open, and the leaf blades flat and lax, mostly 5–10 mm wide. Long, thin auricles are present on most leaves. The ligule is about 1 mm high and arises from a purplish collar.
Flowerhead and Flowers: The flowerhead is 5–15 cm long and bears spikelets arranged flatwise to the stem—mostly two per node but sometimes there is only one. Check several plants when identifying this species. The narrow, lance-shaped, nearly equal glumes extend almost to the top of the spikelet, and have three to five distinct nerves. The edges of the glumes are transparent. There are three to five flowers per spikelet. A curved or straight awn extends from the end of the smooth lemma for 1–3 cm, but the awns may be missing in some varieties.
Habitat: Blue Wildrye grows in meadows, open woods, and dry to moist hillsides. It is a common species among rocky knolls and along lakeshores. In the Columbia Basin region it has been collected most often in the Flathead River region and at scattered locations such as Marble Lake and Marten Ridge.
Similar Species: In the spring, Blue Wildrye can be determined by the light bluish colour of the leaves (hence the species name *glaucous*), but later in the season this character is less obvious. See Hairy Wildrye (*Elymus hirsutus*).





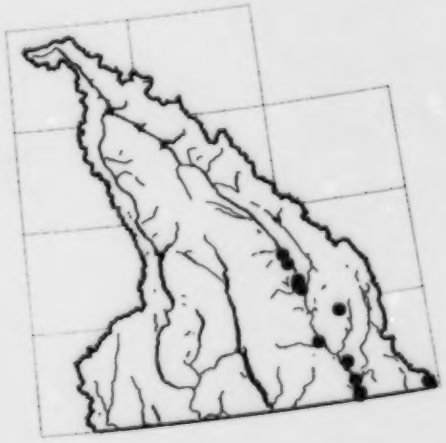
Elymus hirsutus Presl
Hairy Wildrye

Plant: *Elymus hirsutus* is a native species that grows 50–120 cm tall. It is a slender-stemmed tufted perennial that forms small clumps and has a long, nodding or slightly drooping, spike-like flowerhead.
Leaves and Stem: Sheaths are open and there are small or no auricles. Flat leaf blades are 4–10 mm wide. Ligules are only 0.5–1.0 mm high.
Flowerhead and Flowers: The flowerhead is 6–15 cm long and flexuous, and has spikelets loosely arranged more than one per node. Two narrow, awned glumes are slightly shorter than the flowers and have transparent edges. The awns are 15–25 mm long, protrude from the back of the lemmas, and may be straight to slightly curved. There are hairs along the edges of the lemma.
Habitat: Hairy Wildrye occurs in natural meadows, woodlands, and dry to moist slopes. This species occurs at Glacier National Park in the Cougar Valley and at Fairmont Hotsprings in the Columbia Basin region.
Similar Species: This species resembles Blue Wildrye and may interbreed with it. Hairy Wildrye has long hairs along the margin of the lemmas, whereas Blue Wildrye does not. The generally more open and flexuous, nodding stem of Hairy Wildrye is somewhat diagnostic. The flowerhead may appear somewhat more bristly than the flowerhead of Blue Wildrye because of the slightly longer awns, but this is difficult to assess unless you have both species in hand.



Elymus lanceolatus (Scribn. & J.G. Smith) Gould
Agropyron dasystachyum (Hook.) Scribn.
Thickspike Wildrye

Plant: *Elymus lanceolatus* is a native species that grows 40–100 cm tall. It is a perennial with wiry rhizomes and a shiny, blue-green appearance. The flowerhead is erect and stiff with well-spaced spikelets (none overlapping).
Leaves and Stem: The sheath is open and is densely covered in minute hairs. The auricles are 1.5 mm long, and the ragged ligules scarcely reach 0.5 mm high. The stiff and inrolled leaf blades are 2–4 mm wide.
Flowerhead and Flowers: The stiff and erect flowerhead extends 6–15 cm long. The spike axis does not break apart at maturity. Two spikelets per node contain 4–10 flowers. The oblong to slightly pointed glumes are equal and lightly to strongly hairy, and end in a sharp point. The rounded glumes extend slightly more than half-way up the first flower. Lemmas are rarely awned and are densely covered in short hairs.
Habitat: Thickspike Wildrye grows on dry, gravelly creek beds and banks, sandy dunes, and dry, open prairie sites. In the Columbia Basin region these sites are found near Canal Flats, Invermere, and Saint Mary's River.
Similar Species: Thickspike Wildrye is difficult to tell apart from Western Wheatgrass (*Pascopyrum smithii*). Both have rhizomes. Western Wheatgrass has a glume that is curved to one side. You can observe this character by carefully examining the midvein of the glume. M. Barkworth (pers. comm. 1999) has observed hybrids of Thickspike Wildrye and the awned phase of Bluebunch Wheatgrass (*Pseudoroegneria spicata*).



Elymus repens (L.) Nevski
Agropyron repens (L.) Beauv.
Quackgrass

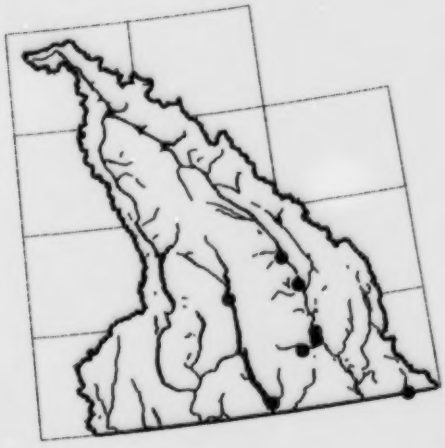
Plant: *Elymus repens* is an introduced species that grows to 100 cm tall. It is a perennial that grows from tough, hard, wiry rhizomes, and it has a dense, narrow, spiky flowerhead. The spikelets are stiff, ascending, and closely crowded along the axis.

Leaves and Stem: The open leaf sheath is mostly hairless, but in some cases the lowermost part of the sheath is soft-hairy. The flat leaf blade is 2–14 mm wide and somewhat ribbed. The clasping auricles are well developed. Ligules are less than 0.5 mm long and gnawed-looking or short-haired.

Flowerhead and Flowers: The flowerhead is stiff and erect and approximately 7–15 cm long. There is one spikelet per node attached directly to the stem without a stalk, and these are alternately arranged. The spikelets are closely crowded and twice as long as the internodes. The glume tip is sharply pointed to blunt, and the glumes are stongly keeled. Glumes are more or less equal and shorter than the first flower. The spike axis does not break apart at maturity. The lemmas can be awnless, or awn-tipped with an awn up to 10 mm long. The lemmas are slightly longer than the glumes.

Habitat: Quackgrass, introduced from Eurasia, is a serious weed in disturbed areas below 1800 m elevation. It has spread throughout the Columbia Basin region.

Similar Species: Quackgrass is also called *Agropyron repens*, and is very similar in appearance to Ryegrass (*Lolium perenne*). Ryegrass has only one glume, whereas Quackgrass has two glumes. One quick visual way to distinguish the two is that Quackgrass has the back of its spikelet (wide side) centred along the axis of the spike, whereas in ryegrass species, the edge of the spikelet (narrow side) is oriented along the axis. Quackgrass might be confused with Slender Wheatgrass (*Elymus trachycaulus*). Slender Wheatgrass is a tufted native species that lacks auricles (or has very small ones) and does not have rhizomes.



Elymus trachycaulus (Link) Gould
Slender Wheatgrass

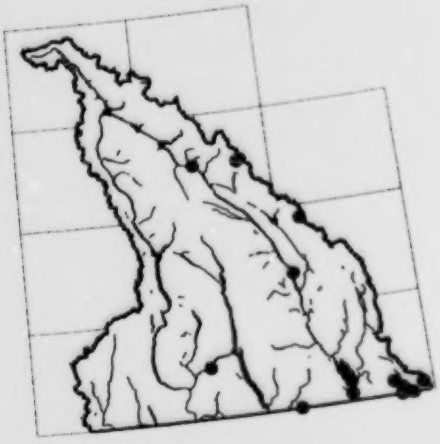
Plant: *Elymus trachycaulus* is a native species that grows 30–100 cm tall. It is a tufted perennial with a spike-like flowerhead that does not break apart at maturity.

Leaves and Stem: The open sheath is hairless to slightly hairy and the auricles are less than 1 mm long. The ligules are smooth-margined or hairy along the edge and less than 0.5 mm high. The flat or inrolled leaves are 1.5–6 mm wide and can have scattered hairs on the upper surface.

Flowerhead and Flowers: The spike-like flowerhead is 4–20 cm long, bearing three to six flowers per spikelet. There is one spikelet per node. The glumes are almost as long as the spikelet, lance-shaped, widest at the middle, and transparent along the margins, with a sharp point and a short awn. The lemmas are smooth or have short hairs, and can have awns or not.

Habitat: Slender Wheatgrass grows in moist to dry sites such as along river flats, beaches, and floodplains. It is common throughout the Columbia Basin region.

Similar Species: Slender Wheatgrass forms fertile hybrids with Alaska Wildrye and Thickspike Wildrye. Douglas et al. (1994) have separated two subspecies based on whether the lemmas have awns or not. Lemmas with 10- to 30-mm-long awns indicate subspecies *subsecundus*. Lemmas without awns or awns less than 10 mm long characterize subspecies *trachycaulus*. Barkworth (1993) in annotating Slender Wheatgrass specimens at the Royal British Columbia Museum, has attached a note to the sheets describing awned specimens of Slender Wheatgrass as occurring only in locations where other awned species, such as Squirreltail Grass, Blue Wildrye, and Foxtail (*Hordeum jubatum*), occur. She suggests that Slender Wheatgrass is an artificial taxon. Alaskan Wildrye differs from Slender Wheatgrass by having glumes that tend to be widest beyond the middle, and have transparent margins that widen until just before the tip.



The genus *Festuca* in Canada is represented in all major floristic zones (Aiken and Darbyshire 1990). In the Columbia Basin region it occurs from the dry, open ridge tops in the alpine zone to the moist valley bottoms and the open, dry grasslands.

The name *Festuca* comes from the Latin word *festuc*, which means a stalk or stem (Borror 1960). This could refer to the long culm that holds up the flowerhead. Aiken and Darbyshire (1990) refer to the origin of the word *Festuca* as being from Latin for weedy grass. This certainly describes the way some people feel about certain introduced *Festuca* species. In Canada, fescues have a long history of introduction as an important part of seed mixtures for rangeland grasses. Species such as *Festuca trachyphylla* and cultivars were seeded because of their resistance to frost and drought. Other introduced species were *Festuca arundinacea*, *F. pratensis*, and some *F. rubra* types. The *F. rubra* complex has some members that are introduced and some species that are native, and these species have hybridized. In the West, native species such as *F. occidentalis*, *F. campestris*, *F. saximontana*, and *F. idahoensis* are important forage species. Naturally occurring hybrids as well as artificial hybrids from breeding programs have compounded the taxonomy of the fescues.

All fescues are perennial, but there is a closely related genus—*Vulpia*—that looks like fescue but has an annual habit. At one time, *Vulpia* was classified within *Festuca*. The annual habit is the main character for differentiating the two genera, and this necessitates looking at the root.

The most recent and comprehensive study of the *Festuca* grasses of North America is available on interactive CD-Rom from the Canadian Museum of Nature. This is an update of the Fescue Grasses of Canada by Aiken and Darbyshire (1990). For a detailed account on British Columbia fescues, Douglas et al. (1994) contains keys to the B.C species.

***Festuca*—Adapted from Douglas et al. (1994)**

1a. Flowerhead appears as a dense one-sided spike; spikelet branches very short; stem densely hairy below the flowerhead ..... *Festuca baffinensis*
1b. Flowerheads not as above but with branches 2
2a. Leaf sheaths with auricles 3
3a. Auricles with scattered hairs along the edge; stems coarse and reed-like ..... *Festuca arundinacea*
3b. Auricles without scattered hairs ..... *Festuca pratensis*
2b. Leaf sheaths without auricles 4
4a. Rhizomes present (may be short); leaf sheaths reddish and fibrous ..... *Fescue rubra*
4b. Rhizomes absent; leaf sheaths not shredding into fibres 5
5a. Lemma awns 1/2 as long to longer than lemma body 6
6a. Leaf blades flat or loosely inrolled (3–8 mm wide) ... . *Festuca subuliflora*
6b. Leaf blades mostly inrolled (less than 2 mm wide) 7
7a. Spikelet axis (rachilla) visible between flowers; glumes not sharply pointed but with more rounded tip, with some hairs along the edge ..... *Festuca idahoensis*

7b. Spikelet axis (rachilla) not visible between flowers; glumes sharply pointed, no hairs along the edge... ..... *Festuca occidentalis*

5b. Lemma awns less than 1/2 as long as lemma body..... 8

8a. Stem nodes not extended from leaf sheaths; dead sheaths breaking off at collars and leaving sheaths than remain for years; living sheaths usually purple ..... *Festuca campestris*

8b. Stem nodes extended from leaf sheaths..... 9

9a. Glumes keeled or rounded..... 10

10a. Dead leaf sheaths not prominent at base of sheaths but split into long fibres; plant of subalpine/alpine..... *Festuca viridula*

10b. Dead leaf sheaths prominent and not splitting into long fibres; rare introduction at lower elevations... ..... *Festuca trachyphylla*

9b. Glumes not keeled..... 11

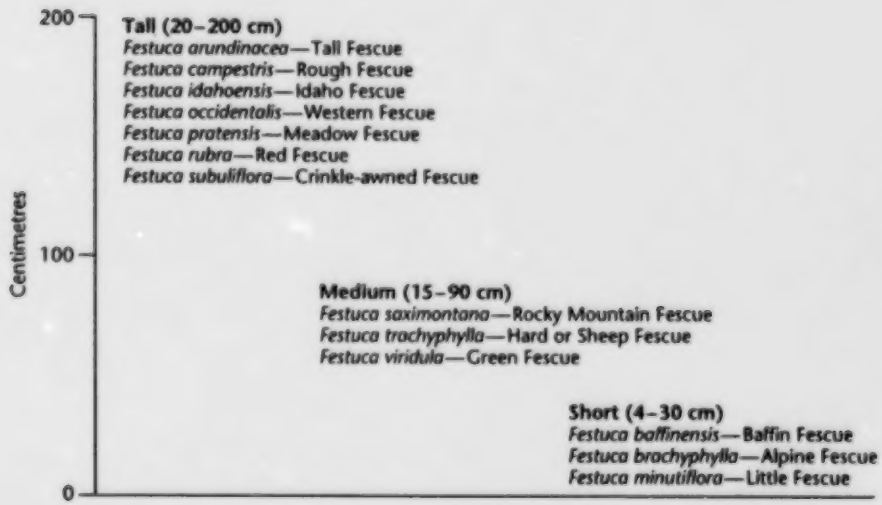
11a. Leaf blades rounded in cross-section... ..... *Festuca saximontana*

11b. Leaf blades angular in cross-section..... 12

12a. Leaves fine, almost hair-like; dead sheaths not prominent at base; living sheaths open to base of plant..... *Festuca minutiflora*

12b. Leaves narrow but not hair-like; dead sheaths more or less prominent at base of plants and splitting; living sheaths closed for 1/2 their length..... *Festuca brachyphylla*

Heights of *Festuca* species



Festuca arundinacea Schreb.
Tall Fescue

Plant: *Festuca arundinacea* is an introduced species that grows 60–200 cm tall. It is a tufted, dark green perennial with no rhizome in specimens observed in Canada, but U.S. specimens may have a rhizome. The flowerhead is relatively long and narrow.

Leaves and Stem: The stem is stout and almost reed-like, with exposed nodes and smooth internodes. The dead sheaths remain at the base of the plant and are smooth to slightly roughened. The leaves are flat, with coarse ridges, and are about 3–12 mm wide. The auricles are obvious and claw-like, with dense hair along the margins. The tiny ligules are ragged-edged and scarcely 2 mm high.

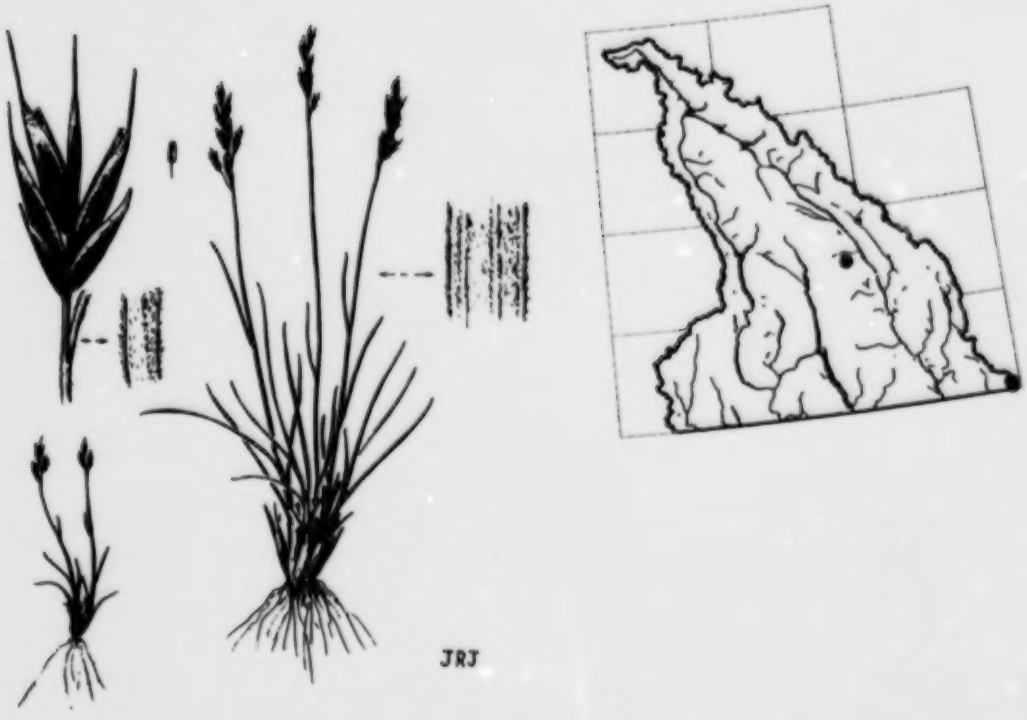
Flowerhead and Flowers: The flowerhead is narrow, 10–35 cm long, and well-branched, and may be somewhat droopy at maturity. Young flowerheads look somewhat spike-like at a distance. The lowest node on the flowerhead has two to three branches. The glumes are much shorter than the spikelets and are smooth and rounded on the back. The lemma is rounded, smooth or rough to the touch, with a 0.3- to 1.5-mm-long awn at the tip of the lemma.

Habitat: Tall Fescue was first introduced from Europe and Asia in 1870, because it is a robust forage that can survive the winter. Since then it has been used for land stabilization and turf. It grows on beaches, roadsides, disturbed areas, and moist meadows, and is widespread in the Columbia Basin region around the Cranbrook and Creston areas.

Similar Species: Tall Fescue is similar to Meadow Fescue (*Festuca pratensis*) in that they are both flat-leaved. Tall Fescue can be distinguished by the hairs on the margins of the auricles, and the leaves are wider and coarser than those of Meadow Fescue (3–12 mm compared to 2–7 mm). These leaves form a more robust tuft in Tall Fescue and the foliage remains fresh after first frost, whereas Meadow Fescue withers quickly. In addition, Tall Fescue has pale, straw-coloured, closed leaf sheaths. Tall Fescue may be confused with the larger members of *Bromus* (bromes), but by looking closely you will notice that the awns of the lemma of Tall Fescue extend from the tip, whereas in *Bromus* they extend from a point between two teeth at the tip.

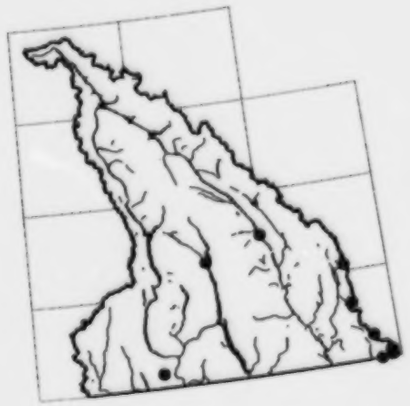
Festuca baffinensis Polunin
Baffin Fescue

Plant: *Festuca baffinensis* is a native species that grows 6–30 cm tall. It is a densely tufted bluish green perennial with no rhizomes. The flowerhead is very compact and dense and appears to have flowers on one side of the stem.
Leaves and Stem: The stem can have exposed nodes or not, but the most easily distinguished character is the densely hairy upper internode. These thick hairs will be obvious when looking with a hand lens at the base of the flowerhead. There are dead sheaths visible at the base of the stem or culm, and these sheaths decay into fibres (splitting between the veins). The living sheaths are open to 1/2 the length to the next node. The obvious auricle consists of an erect swelling. The ligule is 0.1–0.3 mm long, ragged, and blunt. The bristle-like leaves are 0.25–0.5 mm wide, inrolled, and stiff.
Flowerhead and Flowers: The purplish flowerhead is 1.5–4 cm long and brush-like, in that the flowers appear to be on one side of the stem, with the branchlets pointing upward. The glumes are unequal, much shorter than the spikelets, and rounded on the back rather than keeled. The glumes can be smooth or rough to the touch. The lemma is rounded on the back and feels rough or harsh to the touch toward the tip of the lemma. Elsewhere the lemma appears glossy. The awn is 0.8–2.6 mm long.
Habitat: Baffin Fescue occurs in Arctic/alpine sites and its geographic range circles the pole. In the Columbia Basin region it occurs at Mount Festubert, Akamina Ridge, and Paradise Mine.
Similar Species: Baffin Fescue resembles Alpine Fescue (*Festuca brachyphylla*), except that Baffin Fescue has a dark one-sided flowerhead, and is very hairy just below the flowerhead—especially at the node.



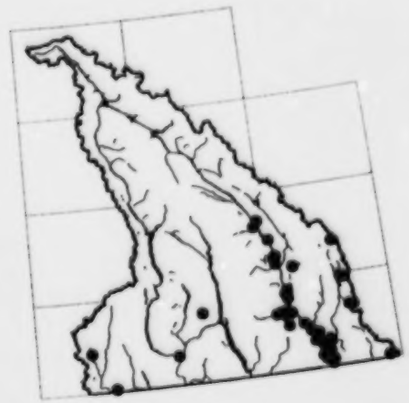
Festuca brachyphylla Schult. and Schult. fil.
Alpine Fescue

Plant: *Festuca brachyphylla* is a native species that grows 5–30 cm tall. It is a bluish to bright green perennial that has a loose or a dense habit, depending on the whether the roots are confined by rocks. The flowerhead is spike-like but not as dense as that of Baffin Fescue.
Leaves and Stem: The stem can have a purplish tinge at the base and may or may not have exposed nodes. The internodes are hairless to sparsely hairy. The dead sheaths remain at the base and the live sheaths are open at least 1/2 their length and are slightly hairy. The auricle is an erect swelling, and there is a ligule that consists only of tiny hairs. Leaf blades are 0.35–0.65 mm wide, stiff, bristle-like, and smooth on the back.
Flowerhead and Flowers: The flowerhead is 1.4–4 cm high and spike-like, and stands erect. Its colour is either green or purple. The short branchlets have small hairs. Glumes are much smaller than the spikelets and are rounded across the back. At the glume tip there may be small hairs but there are no hairs over the back. Lemmas are rounded across the back and may be smooth or rough-hairy at the tip. The awn is 1.2–3 mm long.
Habitat: Alpine Fescue grows on dry slopes in the alpine zone and occurs throughout the Arctic and subarctic areas of the Northern Hemisphere. In the Columbia Basin region it grows at Paradise Mine, Ashman Lake, Mount Festubert, and Old Glory Mountain.
Similar Species: Aiken and Darbyshire (1990) state that there are three other species in this complex that are closely related and look very similar to Alpine Fescue. They are Baffin Fescue, Little Fescue (*F. minutiflora*), and Rocky Mountain Fescue (*F. saximontana*). In Douglas et al. (1994), Rocky Mountain Fescue is separated from the complex by having rounded leaves in cross-section, whereas the other three have angular blades. Baffin Fescue is distinguished from Alpine Fescue by having hairiness near the flowerhead on the stem. To see the differences between Alpine Fescue and Little Fescue check the description under Little Fescue (*F. minutiflora*).



Festuca campestris Rydb.
Rough Fescue

Plant: *Festuca campestris* is a native species that grows 30–140 cm tall. It is a tufted, bluish grey-green perennial. This species rarely has rhizomes, but they do occur on occasion. The flowerhead has stiffly spreading branches and does not droop or nod.
Leaves and Stem: Rough Fescue is a bunchgrass and this form has both living and dead leaf sheaths at the base. The dead leaf sheaths break off at the collars and leave sheaths that persist for several years. The living sheaths are bright purple at the base and hairy with short hairs. The auricle is a distinct swelling. The ligule is 0.1–0.5 mm long and has a hairy appearance. The erect and stiff leaves tend to be inrolled or flat. When the leaves are flat, they can be as wide as 1.2–3.2 mm The underside of the leaf blade is rough.
Flowerhead and Flowers: The flowerhead has stiffly spreading branches that are 4.4–7 cm long. Glumes are shorter than the spikelets and smooth or slightly rough to the touch. The lemma is rough textured but the veins are not prominent. The awn is 0.5–1.5 mm long.
Habitat: Rough Fescue grows in dry to moist meadows and forest openings in the montane and subalpine zones. It is the dominant component in the Bluebunch Wheatgrass association of grasslands. In the Columbia Basin region it is a widespread fescue species.
Similar Species: Pavlick and Looman (1984) in the study of Rough Fescues in Canada and the adjacent United States, determined that there were three very similar species of Rough Fescues in western Canada and that there is no overlap in their ranges. Northern Rough Fescue (*F. altaica*), differs from Rough Fescue by having weak, drooping, deflexed branchlets, and it grows in alpine, subalpine, and boreal sites north of the Columbia Basin region. Rough Fescue, on the other hand, grows in the Columbia Basin region and has rigid, not drooping, branchlets but is somewhat open in the appearance of the flowerhead. Rough Fescue is also similar to Hall's Fescue (*F. hallii*), but Hall's Fescue occurs only east of the Rockies, and it has an erect flowerhead and fewer spikelets. Stem nodes are not visible in any species of the Rough Fescue complex, and this character distinguishes Rough Fescue, Altai Fescue (*F. altaica*), and Hall's Fescue from Rocky Mountain Fescue and Idaho Fescue (*F. idahoensis*).



Festuca idahoensis Elmer
Idaho Fescue

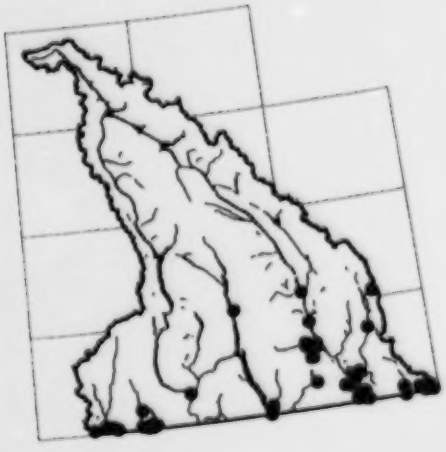
Plant: *Festuca idahoensis* is a native species that grows 30–100 cm tall. It is a clump- or bunch-forming bluish or yellowish green perennial with one to several narrow to partly open flowerheads.

Leaves and Stem: The stem has exposed nodes, and the internodes are smooth with scattered tiny bumps. The dead sheaths remain at the base and living sheaths may or may not have purplish pigments. Sheaths are open and there are no auricles. The smooth to slightly rough leaves occur mostly at the base. The leaves are 0.35–0.6 mm wide, bristle-like, folded, and inrolled, and reach 10 cm long. The ligule is 0.3–0.6 mm long and higher at the sides than in the middle, and has a fringed margin.

Flowerhead and Flowers: The flowerhead is 7–15 cm long and has erect to slightly diverging branches. The spikelets are mostly five- to seven-flowered and spread out along the axis. The glumes are much shorter than the spikelets, and one of the two narrow glumes is about 1/2 the size of the other. The glume tips are rounded. The 4- to 6.5-mm-long rounded lemma bears a stout, erect, 2- to 5-mm-long awn.

Habitat: Idaho Fescue occurs in meadows, dry and rocky slopes, and balds. It is widespread throughout the Columbia Basin region. Idaho Fescue is an important rangeland plant, and in the bunchgrass habitat is codominant with Bluebunch Wheatgrass (*Pseudoroegneria spicata*) (=*Agropyron spicatum*) and Rough Fescue.

Similar Species: There has been a great deal of debate as to whether Idaho Fescue is distinct from Western Fescue (*Festuca occidentalis*), but they do have observable differences. Idaho Fescue has a distinct bunchgrass form, whereas Western Fescue has a loose tuft habit. The flowerheads of Idaho Fescue are not as distinctly spread, and the awns are shorter than those of Western Fescue (2–5 mm compared to 5–10 mm long). Rocky Mountain Fescue (*Festuca saximontana*) is similar to Idaho Fescue, but differs by the size and shape of the flowerhead and the length of lemma awns. However, vegetative or immature specimens may be difficult to distinguish.



Festuca minutiflora Rydb.
Little Fescue

Plant: *Festuca minutiflora* is a native species that grows 4–30 cm tall. It is a delicate, bluish green, loosely to densely tufted perennial. The flowerhead is small with short branches.

Leaves and Stem: The smooth stem rarely has exposed nodes and there are no obvious dead sheaths around the base of the plant. The living sheaths are mostly bluish green or rarely purple. They are open and smooth, and have a midvein. The auricle is an erect swelling and the ligule is 0.1–0.3 mm high. Leaf blades are bristle-like and scarcely 1 mm wide, and appear tightly in-rolled.

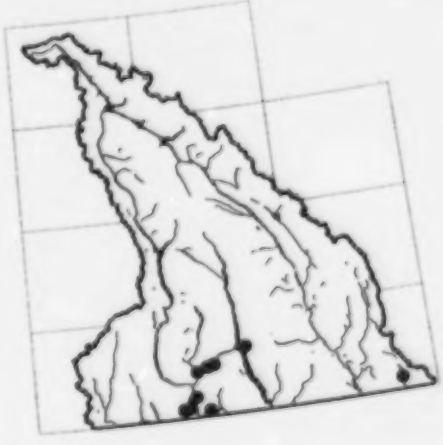
Flowerhead and Flowers: The narrow flowerhead is only 1–5 cm long and has short branchlets. The spikelets are 2.5–5 mm long and have two to five flowers. The glumes are much shorter than the spikelets, rounded on the back, and rough-textured towards the glume tip. Scattered hairs occur along the margins of the glume. The lemma is abruptly and sharply pointed and rough at the tip of the 0.7- to 1.5-mm-long awn.

Habitat: Little Fescue grows scattered on dry, stony slopes in the alpine zone and in meadows in sub-alpine openings. According to Aiken and Darbyshire (1990) it occurs along the Rocky Mountain corridor in the Columbia Basin region.

Similar Species: Little Fescue resembles Alpine Fescue, but has smaller spikelets, more abruptly pointed glumes, and shorter awns.

***Festuca occidentalis* Hook.**
Western Fescue

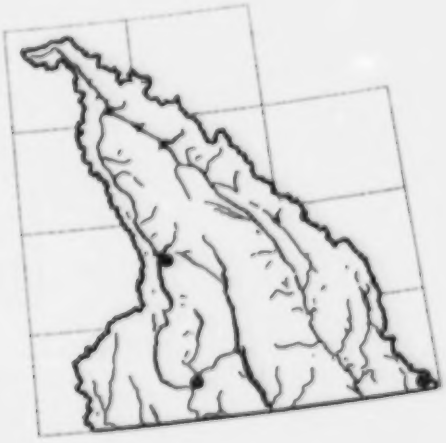
Plant: *Festuca occidentalis* is a native species that grows 25–110 cm tall. It is a tuft-forming perennial with hair-like leaves, a few slender stems, and an open flowerhead.
Leaves and Stem: Western Fescue grows from a large clump of hair-like basal leaves. The sheaths are open and smooth. The soft inrolled leaf blades scarcely reach 1 mm wide. The ligules are only 0.5 mm long and are fringed at the tip. There is no auricle.
Flowerhead and Flowers: The open-branched flowerhead is 7–20 cm long and usually droops at the tip. At maturity, the branchlets are visible between the spikelets. The two unequal and reflexed branches at the lower node separate Western Fescue from other fescues. Spikelets are three- to five-flowered and crowded close together on the axis. The glumes are unequal and sharply pointed and much shorter than the spikelet. The 5-mm-long membraneous lemma tapers into a 5- to 10-mm-long bendable awn attached at the tip of the lemma.
Habitat: Western Fescue inhabits meadows, open moist woods, edges of woods, rocky slopes, streambanks, and lake margins. In the Columbia Basin region it grows near Cranbrook, Nelson, Rossland, and Fruitvale.
Similar Species: Idaho Fescue is very similar to Western Fescue, but Western Fescue has smaller lemmas (4–6 mm)—some of which are always shorter than the awn. Idaho Fescue has a tight, narrow flowerhead compared to the open flowerhead of Western Fescue, and Idaho Fescue usually favours drier sites than does Western Fescue.



Festuca pratensis Hudson
Meadow Fescue

Plant: *Festuca pratensis* is an introduced species that grows 30–120 cm tall. It is a loosely tufted perennial with or without rhizomes. The flowerhead is tightly closed at maturity, but relatively long.
Leaves and Stem: Nodes are exposed along the smooth stem. The brown, dead sheaths do not remain intact at the base of the plant; instead they split into fibres. Living sheaths are round, open, and hairless and may be purplish. The auricles are clearly visible, claw-like, and smooth. The ligule has a ragged-looking margin and is 0.2–0.4 mm high. Flat, loosely inrolled leaf blades are 2–7 mm wide and droop.

Flowerhead and Flowers: The narrow flowerhead ranges from 6 to 22 cm long. Its lowest node has two branches. Two unequal glumes are much shorter than the spikelet and have rounded backs. They feel slightly rough textured and have wide transparent margins. The lemmas are rounded on the back and smooth to rough near the tip. The veins along the back of the lemma do not reach the tip, ending instead at the transparent margin. The lemma is usually awnless or it may bear a small hair that is less than 2 mm long
Habitat: Although there are no specimens of Meadow Fescue in the Royal British Columbia Museum collections from the Columbia Basin region, we have included a description of the species because it has been documented as occurring in British Columbia by Aiken and Darbyshire (1990), from near Revelstoke and Castlegar, and in the Flathead region of the Columbia Basin region.
Similar Species: Meadow Fescue is one of the parents in a hybrid with Perennial Ryegrass (*Lolium perenne*) (see the *Festulolium* x *Loliaceum* description). The offspring of the cross do not resemble the *Festuca* parent very closely. Meadow Fescue sometimes resembles smaller forms of Tall Fescue. A character useful in distinguishing the two is the dense hair along the margins of the auricle of Tall Fescue.



***Festuca rubra* L.**
Red Fescue

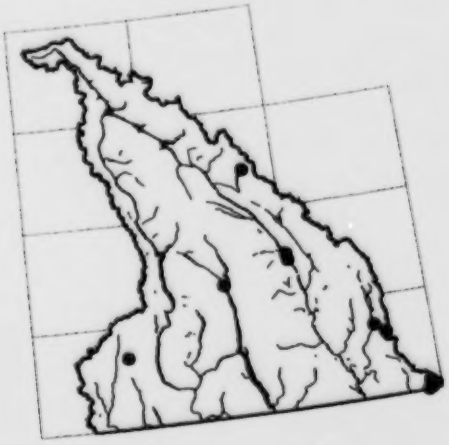
Plant: *Festuca rubra* has native and introduced subspecies. It is a 20- to 100-cm-tall perennial that usually grows from rhizomes and forms loose clumps. The stems are decumbent near the reddish purple base. The narrow to open flowerhead has a few widely separated spikelets.
Leaves and Stem: The stems are thin. The live sheaths are closed for more than 1/2 of their length. Open, live sheaths disintegrate with age into brown curled fibres. The leaf blades are 0.4–1.1 mm wide, folded, inrolled, and hairless, but more or less lax. There are no auricles. The ligules are 0.5 mm long.
Flowerhead and Flowers: The flowerhead is narrow and 3–20 cm long, and it branches. The spikelets vary from reddish purple to glaucous green. There are four to seven flowers above the two narrow glumes. One of the glumes is slightly shorter than the other, and both are much shorter than the spikelet. The lemmas are 5–8.5 cm long with a short awn arising from the tip.
Habitat: Red Fescue grows in a wide variety of habitats including wet meadows and streambanks, clearings, fields, and roadsides. In the Columbia Basin region, this species has been collected from the Windermere Lake area, Wardner, and Creston Flats.

Similar Species: Red Fescue, in the broad sense, includes many subspecies (which are considered species by some) and many varieties (Pavlick 1985). There are two subspecies in the collection at the Royal BC Museum: subspecies *rubra* and subspecies *vallicola*. Red Fescue is also included as part of seed mixtures of native and non-native stocks. Expect a lot of variability in this species.

Festuca saximontana Rydb.
Rocky Mountain Fescue

Plant: *Festuca saximontana* is a native species that grows 5–60 cm tall. It is a densely tufted perennial without rhizomes. The plant is bluish grey to pale green overall. The erect flowerhead has a spreading form at maturity.
Leaves and Stem: The smooth stems sometimes have exposed nodes. Dead sheaths remain at the base of the plant but do not break up into fibres. Living sheaths are open almost to the base. They are covered in sparse, minute, backward-facing hairs. The auricle area has a distinct erect swelling. The ligule is 0.1–0.5 mm long and has a roughly gnawed-looking or torn margin. The leaf blades are stiff and 0.3–0.7 mm wide.
Flowerhead and Flowers: The flowerhead has erect or spreading branches. The glumes are shorter than the spikelet, unequal and rough at the tip. They are rounded to slightly keeled. Glume margins are irregular. The lemmas are rounded and smooth on the back, and there are short, stiff hairs at the tip and on the 0.4- to 2-mm-long awn.

Habitat: Rocky Mountain Fescue grows in dry to mesic meadows from the montane to subalpine zone. In the Columbia Basin region two subspecies have been collected: *purpusiana* and *saximontana.* Douglas et al. (1994) state that "*F. saximontana* ssp. *purpusiana* is the name given to subalpine and alpine forms which are 8–20 (25) cm high, in which the culms are about 2–3 times the length of the basal tufts and the spikelets are moderately purplish."
Similar Species: Alpine Fescue is similar to Rocky Mountain Fescue—see Alpine Fescue (*F. brachyphylla*). The differences between the two subspecies *saximontana* and *purpusiana* appear to be in the amount that the leaf sheaths are open. The leaf sheath is never closed more than 1/3 its length in subspecies *saximontana* whereas it is closed about 1/2 the total length or more in subspecies *purpusiana.* Douglas et al. (1994) separate the two varieties on habitat preferences—subspecies *saximontana* occurs in the montane or boreal zones, whereas subspecies *purpusiana* occurs in alpine or subalpine zones.



Festuca subuliflora Scribn.
Crinkle-awned Fescue

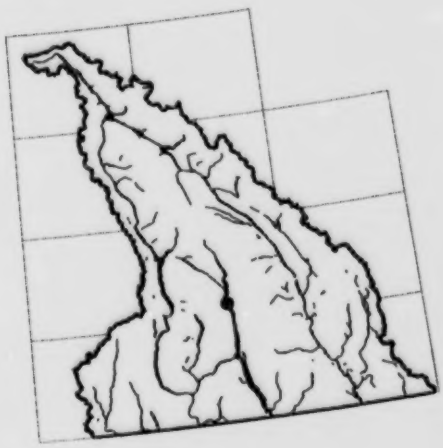
Plant: *Festuca subuliflora* is a native species that grows 50–100 cm tall. It is a tuft-forming perennial with leaves up to the base of the open, widely branched flowerhead.

Leaves and Stem: Stout stems arise from a scarcely leafy base. Sheaths are open and smooth to hairy. Leaf blades are flat, sometimes inrolled, drooping, and hairy on the upper surface. They are narrowed at the base but 3–8 mm wide otherwise. The small ligule is 0.5 mm high and has a fringe of relatively coarse hairs. There are no auricles.

Flowerhead and Flowers: The flowerhead is 20 cm long, loose, and open, and has only one or two drooping branches at a node. Spikelets contain three to five loosely fitted flowers. The two, unequal, very narrow glumes are much shorter than the spikelet. The lemma is 7 mm long and has a prominent, 0.5- to 2.0-cm-long, thin awn that extends from the minute, two-toothed tip. The awn is usually crinkly, twisted, or bent.

Habitat: Crinkle-awned Fescue generally grows in moist, partly shaded sites in forest and woodland, but may occur on moist slopes and in meadows. The plant is usually loosely rooted in humus. Crinkle-awned Fescue occurs near Lardeau in the Columbia Basin region.

Similar Species: The minute, two-toothed lemma tip may be confused with *Bromus* species. The awn in *Bromus* is attached well below the two teeth, whereas in *Festuca* it is attached at the tip.



Festuca trachyphylla (Hack.) Kraj.
Hard Fescue

Plant: *Festuca trachyphylla* is an introduced species that grows 20–75 cm tall. It is a coarse, densely tufted, blue-green to pale green perennial without rhizomes. The narrow and moderately long flowerhead has densely clustered to lax branches.

Leaves and Stem: The stems have exposed nodes and the dead sheaths remain at the base and do not decay into fibres. The purplish, living sheaths are open to the base, and have a prominent midvein, but a rounded back. The auricle is a distinct swelling. The ligule has a ragged edge and is 0.2–0.5 mm high. The leaf blades are 0.4–0.6 mm wide, almost bristle-like, and rough textured.

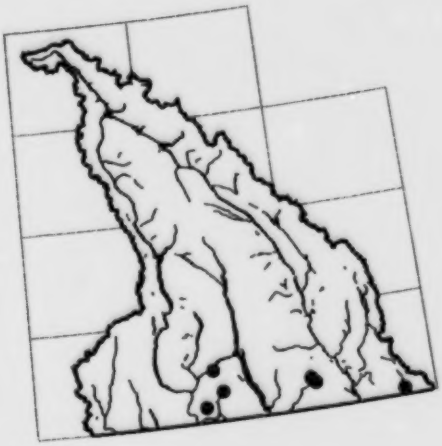
Flowerhead and Flowers: The narrow flowerhead is 3–9 cm long. Branchlets are visible between the flowers on each spikelet. The unequal glumes are shorter than the spikelets. They are rounded on the back and rough at the tip. Lemmas are rounded across the back and are either hairless or hairy at the tip. The awn is 0.5–2.5 mm long.

Habitat: Hard Fescue was introduced for forage from Eurasia because of its frost- and drought-tolerance. Through commercial seeding and naturalization, the distribution of Hard Fescue now extends throughout most of Europe and North America. It grows in disturbed areas near Salmo.

Similar Species: Green Fescue is like Hard Fescue, except that, according to Douglas et al. (1994), Green Fescue has longer anthers and is found in high mountain habitats. As part of the Sheep Fescue complex, Hard Fescue bears some resemblance to native sheep fescues, such as Western Fescue, Idaho Fescue, Rocky Mountain Fescue, and Green Fescue, but is an introduced species developed by hybridization.

Festuca viridula Vasey
Green Fescue

Plant: *Festuca viridula* is a native species that grows 35–80 cm tall. It is a perennial that forms small clumps from short rhizomes. The flowerhead is open to somewhat contracted.
Leaves and Stem: Exposed nodes and the internodes are smooth. The dead sheaths do not remain around the base of the plants but decay into long fibres. The living sheaths may or may not be purplish and are open or closed for 1/4 their length. The auricle is a distinct swelling. The ligule has a ragged margin and is 0.2–0.5 mm high. The leaf blades are lax, narrow, and 0.8–2.0 mm wide, but, when dry, have inrolled edges.
Flowerhead and Flowers: The flowerhead ranges from open to contracted, reaching 4–12 cm long. It is important to observe whether the flowerhead is mature or not. An immature flowerhead will appear contracted. The glumes are unequal and much shorter than the spikelet. They are distinctly keeled and rough at the tip. The lemmas are keeled at least close to the tip, often green at the base, and purplish towards the tip. The lemma may be awnless, or may have a 0.2- to 0.5-mm-long hair-like awn.
Habitat: Green Fescue grows on mesic and dry slopes in the alpine and subalpine zones in the Rocky Mountains. It occurs near Nelson in Kokanee Glacier Provincial Park and at Procter Lake in the Flathead.
Similar Species: Hard Fescue is like Green Fescue, except that, according to Douglas et al. (1994), Green Fescue has longer anthers and is found in high mountain habitat.



Glyceria species are tall, aquatic or marsh perennials that have creeping stems that root at the stem nodes, or have strong rhizomes. The sheaths are closed or partially closed and the leaf blades are flat to slightly inrolled. The flowerheads are open and have long, drooping, fine branches, or the branches are pressed tightly to the stem. Whether the lemmas of *Glyceria* have seven obvious ridges or not, and whether there are rounded or flattened spikelets in the flowerhead, are two major characters used in differentiating the various species in the genus.

The name *Glyceria* comes from the Greek word *glukeros*, meaning sweet, referring to the sweet seed that is favoured by many waterfowl. The species are very palatable but are restricted to wet sites and moist woodlands. In many areas these species, especially *Glyceria striata*, are grown on wet marshes for grazing or to attract waterfowl.

There are eight species of *Glyceria* found in British Columbia (Douglas et al. 1994). Three of these species are Blue listed in the Rare Native Vascular Plants of British Columbia by Douglas et al. (1998). Two of these Blue-listed species—*Glyceria leptostachya* and *G. pulchella*—occur in the Columbia Basin region. *Glyceria pulchella* is a boreal species and southern British Columbia is the southern extent of the range.

***Glyceria*—Adapted from Hickman (1993) and Cody (1996)**

1a. Spikelets linear or cylindrical in outline; branches pressed close to the axis 2

2a. Lemma smooth between slightly rough veins ..... *Glyceria borealis*

2b. Lemma rough throughout and distinctly rough on veins... ..... *Glyceria leptostachya*

1b. Spikelets oval in outline; branches spreading outward 3

3a. Glumes 1.5–2.3 mm long 4

4a. Lemma purplish and widest at or below the middle... ..... *Glyceria grandis*

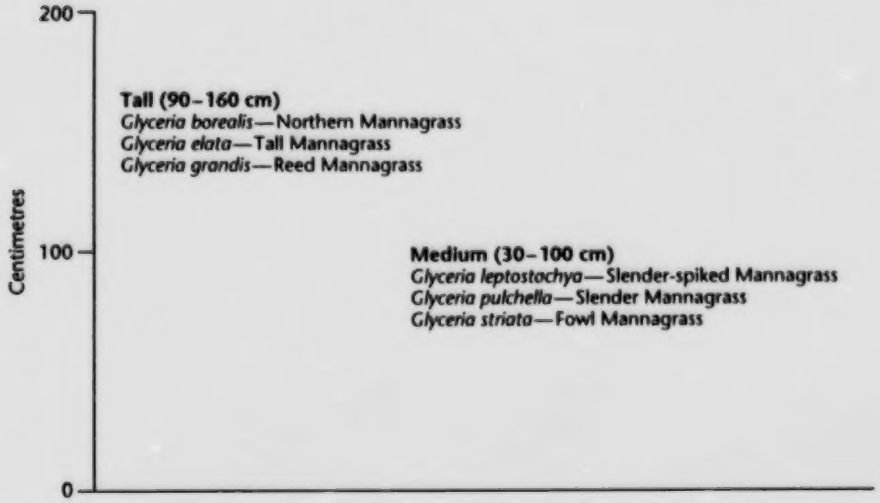
4b. Lemma purplish, whitish, or brown; widest above the middle with broad rough edges..... *Glyceria pulchella*

3b. Glumes less than 1.5 mm long 5

5a. Lower glume less than 1 mm long; lemmas small, prominently nerved..... *Glyceria striata*

5b. Lower glume 1.0–1.5 mm long ..... *Glyceria elata*

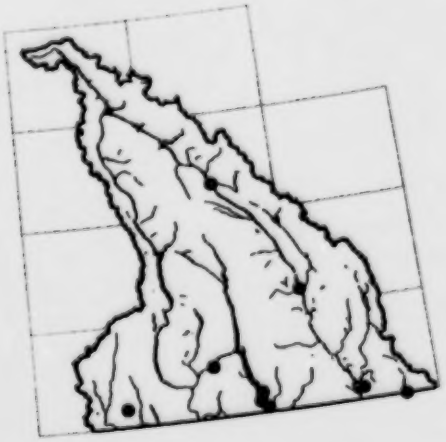
Heights of *Glyceria* species



Glyceria borealis (Nash) Batch.
Northern Mannagrass

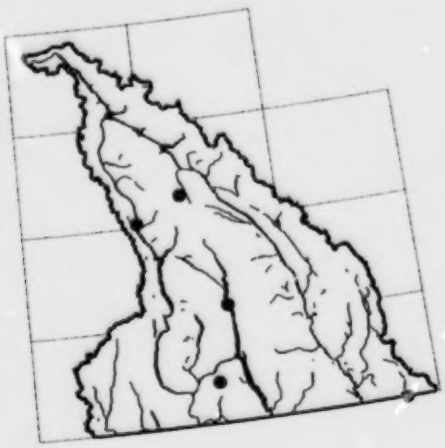
Plant: *Glyceria borealis* is a native species that grows to 1 m tall. It is a perennial with rhizomes or stems that creep along the ground for a short distance and root at the nodes. The narrow flowerhead has branches that are pointing upwards and are pressed toward the stem axis.
Leaves and Stem: The smooth sheaths are flattened and open for 1–4 cm. Sharply pointed ligules are 5–10 mm long and minutely hairy along the edge. Flat leaves are 3–5 mm wide and covered with small projections that do not feel rough. There are no auricles.
Flowerhead and Flowers: The flowerhead is 45 cm long and has branches that are pressed close to the stem axis and point upward. Narrow spikelets have parallel sides and are rounded (flattened cylindrical) rather than compressed. The awnless, papery glumes are transparent and shorter than the lowest lemma. The awnless lemma has seven noticeably rough, raised nerves. These ridges do not converge at the tip but end at the transparent edge. Sometimes short soft hairs occur between the nerves.

Habitat: Northern Mannagrass is native to northern North America where it grows in wet meadows, fens, and swamps and along lakeshores in the lowland to montane zones. It occurs in the Columbia Basin region near Nelson, Creston, Canal Flats, and Golden.
Similar Species: Northern Mannagrass has a similar flowerhead to the Blue-listed Slender-spiked Mannagrass (*Glyceria leptostachya*), but there are differences. The leaves of Northern Mannagrass are bumpy but not rough on the upper surfaces, whereas the upper leaves of Slender-spiked Mannagrass are rough. This difference can be determined by rubbing the top of the leaves. Rough feels like sandpaper, whereas bumpy feels more like irregular bumps. The lemma of Northern Mannagrass has small bumps along the ridges, but is smooth between the nerves. Slender-spiked Mannagrass has rough-feeling hairs throughout the entire surface of the lemma. To distinguish these features you will definitely need a hand lens.



Glyceria elata (Nash) M.E Jones
Tall Mannagrass

Plant: *Glyceria elata* is a native species that grows 1–1.5 m tall. It is a perennial with creeping rhizomes and a loose, open, pyramid-like flowerhead consisting of spreading branches.
Leaves and Stem: The rough sheath is closed almost to the top. The ragged, blunt ligules are 3–6 mm high and are open in the front. There are no auricles. The flat leaf blades are 6–10 mm wide.
Flowerhead and Flowers: The flowerhead is loose, open, and 15–25 cm long and has spreading branches. The glumes are shorter than the lemmas and are torn along the edge. The lemmas have seven raised ridges with a tip that is ragged and are widest above the middle. The tip of the palea has narrow slits. The palea often appears almost transparent, so inserting a piece of black paper under the palea helps to see the slits clearly.
Habitat: Tall Mannagrass grows in wet areas such as along streams, along lakeshores, and in wet meadows in lowland to montane zones. In the Columbia Basin region Tall Mannagrass occurs at Mount Revelstoke and Glacier National Parks, near Nelson, and at Lardeau.
Similar Species: Tall Mannagrass resembles Fowl Mannagrass (*Glyceria striata*). Tall Mannagrass has ligules that are open in the front and 3–6 mm high, whereas Fowl Mannagrass has closed ligules that are only 1–3 mm high. Check the edges of the ligules carefully to see if they are torn.



Glyceria grandis S. Wats. ex A. Gray
Reed Mannagrass

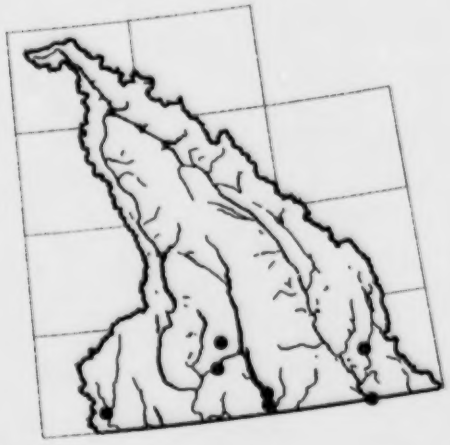
Plant: *Glyceria grandis* is a native species that grows 90–200 cm tall. It is a tufted, stout perennial with rhizomes. The flowerhead is open and loose and has numerous spreading branches.

Leaves and Stem: Smooth to slightly rough sheaths are closed to the top or open up to 1 cm at the most. The ligules are 4–9 mm long and blunt and have edges with almost no teeth. There are no auricles. The flat, firm leaf blades are 6–15 mm wide, and they have a rough upper surface and a smooth underside.

Flowerhead and Flowers: The open, loose flowerhead is 20–35 cm long and has numerous spreading branches. Spikelets are slightly flattened and four- to seven-flowered. The glumes are pointed and the second glume is 1/2 the size of the first. The lemmas are widest at the middle, obviously seven-nerved, and have a slightly ragged blunt tip. The palea has a V-shaped notch at the tip, or appears jagged. This feature may be difficult to observe. Open the flower over black paper to make the palea more visible.

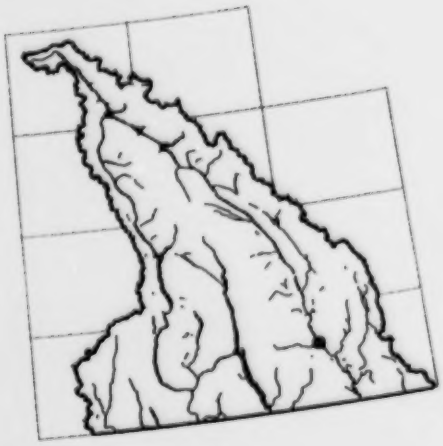
Habitat: Reed Mannagrass grows in wet areas along lakeshores and in wet meadows at all elevations below the subalpine. In the Columbia Basin region, Reed Mannagrass occurs at Nelson, Roosville, and Creston.

Similar Species: Reed Mannagrass is similar to Tall Mannagrass, but is distinguished by its longer glumes: 1.3–3.5 mm in Reed Mannagrass compared to 0.6–1.5 mm in Tall Mannagrass.



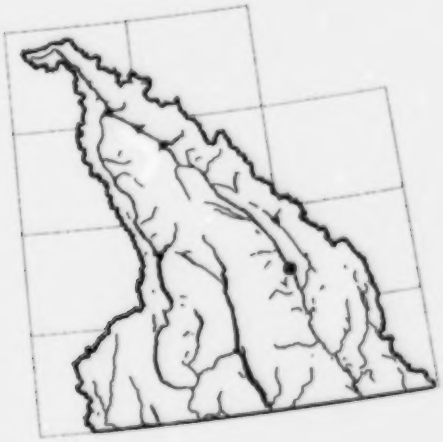
Glyceria leptostachya Buckl.
Slender-spiked Mannagrass

Plant: *Glyceria leptostachya* is a native species that grows 60–100 cm tall. It is a perennial with rhizomes and erect stems, or stems that recline on the ground for a short distance. The open flowerhead has a few branches.
Leaves and Stem: The flattened sheaths are sometimes rough and closed for most of their length, but can be open for 1 cm. Sharp-pointed ligules are 6–11 mm long and rough-edged. The leaf blades are 3–7 mm wide, slightly in-rolled, and rough on both surfaces. There are no auricles.
Flowerhead and Flowers: The flowerhead is 40 cm long and loose and has a few branches pressed close to the stem axis. Spikelets are long, cylindric, and rounded across the back. The short membrane-like glumes are 1/2 the size of the lemma. The lemma is greater than 3 mm long, strongly seven-nerved with rough, short, stiff hairs on and between the ridges. The ragged and transparent upper edge of the lemma can be purplish.
Habitat: Slender-spiked Mannagrass occurs in wet meadows and along lakeshores. This species grows along the Saint Mary's River near Kimberley. It is Blue listed in Douglas et al. (1998).
Similar Species: Slender-spiked Mannagrass resembles Northern Mannagrass, but differs in leaf blade texture (Douglas et al. 1994). Slender-spiked Mannagrass has a rough texture to the upper leaf blades, whereas Northern Mannagrass has a smooth leaf blade.



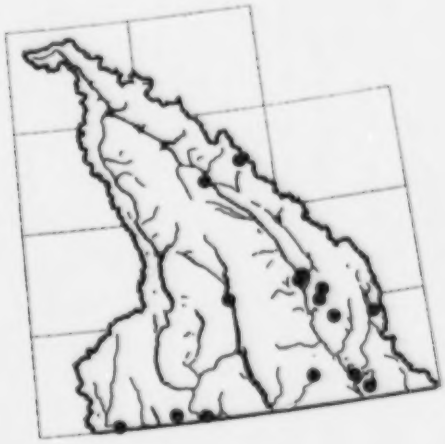
Glyceria pulchella (Nash) K. Schum.
Slender Mannagrass

Plant: *Glyceria pulchella* is a native species that reaches 50–100 cm tall. It is a perennial that grows from a rhizome and has a loose, sometimes drooping, flowerhead and flexible branches.
Leaves and Stem: The open sheath is smooth. Pointed membrane-like ligules stand 1.5 mm high. The drooping, flat leaf blades are 2–6 mm wide and are somewhat inrolled. There are no auricles.
Flowerhead and Flowers: The flowerhead is usually less than 20 cm long, loose, and somewhat drooping. Thin branches are 8–10 cm long. The papery glumes are broad toward the top, greater than 1.0–1.5 mm long, and pale purplish brown or whitish and transparent. Glumes are almost as long as the first lemma and have ragged tips. The awnless lemmas are rough and have broad, ragged margins.
Habitat: Slender Mannagrass occurs commonly in Boreal North America. The Columbia Basin region includes the southern limit of its range. Douglas et al. (1994) excluded it from the Vascular Plants of British Columbia, but included it in Rare Native Vascular Plants of British Columbia, Douglas et al. (1998), based on one historic record in the Columbia Basin region near Columbia Lake. There are no specimens of Slender Mannagrass at the Royal British Columbia Museum from the Columbia Basin region.
Similar Species: Slender Mannagrass is one of the three *Glyceria* species that is Blue listed in British Columbia (Douglas et al. 1998). It resembles Reed Mannagrass, but the plant is smaller, less stout, and fewer flowered. It may be also confused with Fowl Mannagrass (*Glyceria striata*), which has less than 1-mm-long glumes and small lemmas.



Glyceria striata (Lam) A.S. Hitchc.
Fowl Mannagrass

Plant: *Glyceria striata* is a native species that grows 30–80 cm tall. It is a densely tufted perennial with a rhizome. The mature flowerhead is open with slender upward-pointing branches.
Leaves and Stem: The rough sheath is closed for most of its length and may have a purplish base. The membraneous ligules are usually closed in front, but may split. Looking along the edge of the sheath, you may notice a lighter line, which will split if pressure is applied to it. The blunt ligules are 1–3 mm long, and have a rough or bumpy surface and ragged edges. The leaf blades are flat to folded and 2–5 mm wide.
Flowerhead and Flowers: The flowerhead is 7–25 cm long and loose and has slender upward-pointing branches. If the flowerhead is immature, the branches may appear to be pressed towards the stem axis. If part of the flowerhead is still enclosed in a sheath, then the flowerhead is immature and it will assume a more spreading form with maturity. The spikelet appears oval in outline. The less than 1-mm-long glumes are minutely hairy with rough, jagged margins. The first glume is twice as long as the second, and this will help distinguish this species from Tall Mannagrass and Slender Mannagrass. The broad lemmas are barely 2 mm long, and have seven nerves—they are clearly visible without a hand lens.
Habitat: Fowl Mannagrass grows in wet places such as bogs, lakeshores, and wet meadows. Throughout the Columbia Basin region, Fowl Mannagrass is widespread and occurs at locations such as Fairmont Hotsprings, Moyie, Canal Flats, and Armstrong Bay.
Similar Species: Fowl Mannagrass resembles Tall Mannagrass, but it has 1- to 3-mm-long ligules, whereas Tall Mannagrass has 3- to 6-mm-long ligules. Fowl Mannagrass is also often mistaken for Reed Mannagrass, which has coarser leaves. Reed Mannagrass has distinct cross-ridges in the leaves, especially close to the leaf collar on the sheath and leaf blade. The leaf blades of Fowl Mannagrass are 2–5 mm wide, and considerably narrower than the leaf blades of Reed Mannagrass; take care if using the leaf blade as a determining factor, as you may have an immature specimen of Reed Mannagrass.



The genus *Hierochloe* has a long association with holy ceremonies. The name comes from the Greek *hieros*, meaning sacred, and *chloë*, meaning grass or holy-grass. In Northern Europe it was placed in front of churches on Saints' days. Throughout North America, First Peoples appreciated sweetgrass for the scent. It was woven into baskets and mats, burned as incense, or worn in a sachet as an insect repellent. The fresh, sweet scent comes from coumarin, a crystalline substance that was once extracted and used commercially as flavouring. There are two species found in British Columbia: *Hierochloe alpina*, which grows in the subalpine and alpine zones, and *H. odorata*, which grows in moist meadows, streambanks, and forest openings from lowland to subalpine zones. Only *H. odorata* occurs in the Columbia Basin region.

Hierochloe odorata (L.) Beauv.
Common Sweetgrass

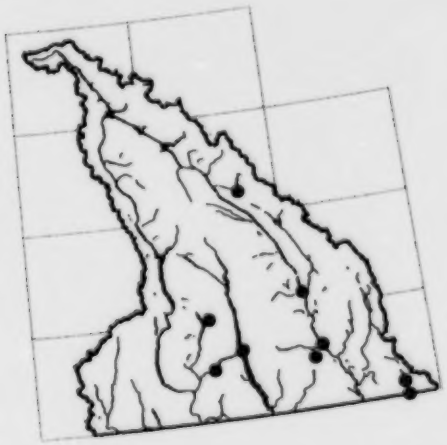
Plant: *Hierochloe odorata* is a native species that grows 30–50 cm tall. It is a sweet-scented perennial with purple bases and rhizomes. The open flowerhead is pyramid-shaped.

Leaves and Stem: Open sheaths are smooth to slightly hairy. The ligules are 3–5 mm long, have blunt to pointed tips, and are slightly ragged along the upper edges. There are two kinds of leaf types—leaves formed without stems (vegetative) and leaves formed with stems. The leaves that form along the stems are narrower (1–2 mm) than leaves that form without stems (3–5 mm). The collars on the sheaths of basal leaves often have white hairs. There are no auricles.

Flowerhead and Flowers: The flowerhead is open, 5–10 cm long, and pyramid-shaped. Each brown and shiny spikelet contains three flowers. Two lower flowers contain only stamens, and look like scales; the fuller third flower is complete. The wide, smooth glumes equal or exceed the flowers in length. The unawned lemmas are finely hairy all over and pointed.

Habitat: Sweetgrass is classified as native due to its global distribution, which is circumpolar. It is widely distributed in British Columbia east of the Coast-Cascade Mountains but rarely grows in abundance at any one location. The preferred sites are moist meadows, streambanks, and forest openings from lowland to sub-alpine zones. Sweetgrass occurs at Canal Flats, Nelson, Cranbrook, Flathead River, Peckam's Lake, Kootenay Lake, and Graystokes Plateau.

Similar Species: Common Sweetgrass is like Alpine Sweetgrass (*Hierochloe alpina*) except that it has a membrane-like ligule and no awns. Alpine sweetgrass has awned flowers, and the ligule is 1/2 membrane-like and the other 1/2 is long hairs. The sweet smell, brown shiny spikelets, and the two staminate flowers in each spikelet make this genus distinctive.



This genus includes the cultivated barley plant *Hordeum vulgare*, but it also contains many weedy species. Six species of *Hordeum* occur in British Columbia. Two of these grow in the Columbia Basin region, *Hordeum brachyantherum* and *H. jubatum*. They are of some importance as forage grasses but are also a nuisance to livestock because of their long awns.

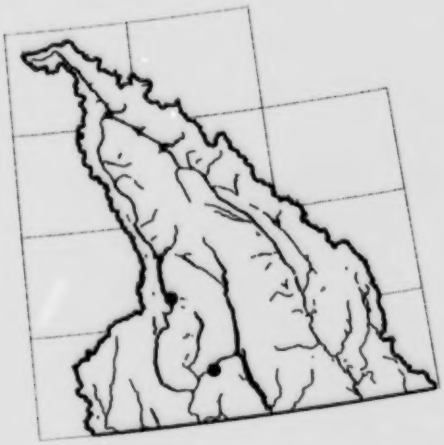
***Hordeum*—Adapted from Douglas et al. (1994)**

1a. Flowerhead including awns nearly as wide as it is long. . . . . *Hordeum jubatum*

1b. Flowerhead including awns much longer than it is broad. . . . . *Hordeum brachyantherum*

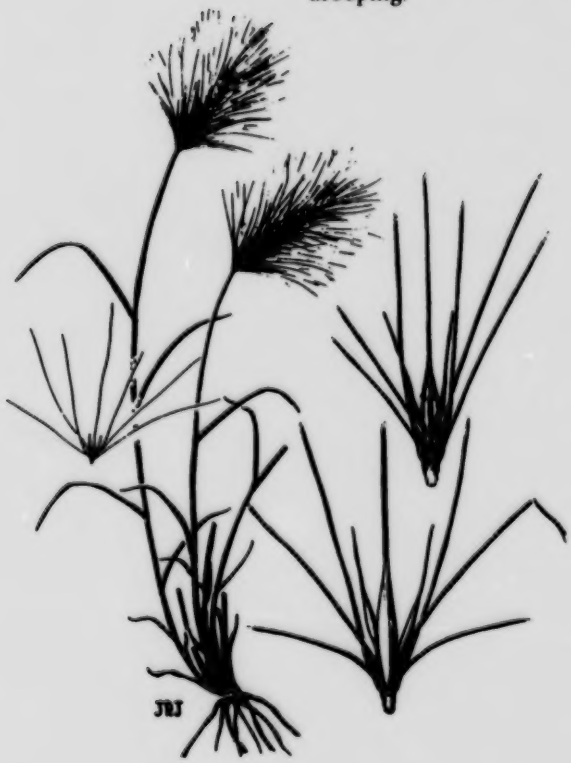
Hordeum brachyantherum Nevski
Meadow Barley

Plant: *Hordeum brachyantherum* is a native species that grows 40–100 cm tall. It is a tufted perennial that bears a stiff, erect stem with a spike-shaped flowerhead.
Leaves and Stem: Sheaths are open. Leaf blades range from 2 to 9 mm wide. There are no auricles, and the ligules are scarcely 0.5 mm high and minutely hairy at the tip.
Flowerhead and Flowers: The relatively narrow, erect, terminal flowerhead is 5–10 cm long. It shatters easily when ripe. There are usually two to three spikelets per node of the flowerhead, each spikelet usually with one flower. The central spikelets are attached directly to the stem, while the other two are on short, curved stalks. The two glumes are 7–12 mm long and are so narrow that they look like awns. The lemma of the central flower extends into a long awn. The lateral flowers may be modified into awn-like structures.
Habitat: Meadow Barley grows usually in moist meadows and possibly at the edges of marshes or streams along forest openings. In the Columbia Basin region it occurs at Nelson and Nakusp.
Similar Species: You may encounter Cultivated Barley (*Hordeum vulgare*) in fields, in pastures, and around livestock. It rarely persists for more than a year, being unable to invade "natural" or even disturbed habitats. Common Barley is like Meadow Barley, except that it has well-developed auricles (>1 mm), whereas Meadow Barley and Fox-tail Barley (*H. jubatum*) have no auricles.



Hordeum jubatum L.
Fox-tail Barley

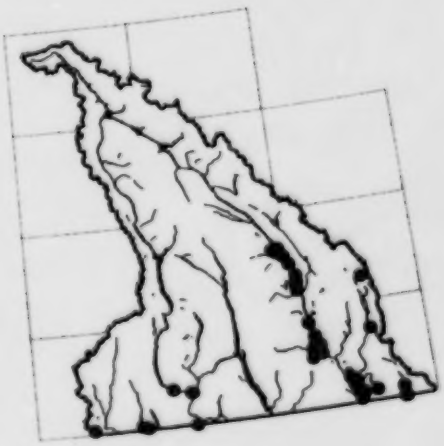
Plant: *Hordeum jubatum* is a native species that grows 20–50 cm tall. It has a showy, silvery to reddish, soft, whisk-shaped, and nodding flowerhead (like a fox's tail).
Leaves and Stem: Stems are smooth to soft-hairy. Sheaths are open nearly to the node below. Flat leaf blades range from 2 to 5 mm wide and up to 18+ cm long. Auricles 0.5 mm long occur on some leaves. Ligules range from 0.2 to 0.6 mm long, and form a frilled collar of even height.
Flowerhead and Flowers: The flowerhead is 5–10 cm long (including the awns) and whisk-like. There are three spikelets per node, of which the central one is usually the largest. Spikelets are attached directly to the central stalk, not by a pedicel like many other grasses. The spikelets are arranged in rows, one above the next on the central axis. Spikelets are generally one-flowered. There are two, narrow, equal, 2- to 6-cm-long glumes that look like awns, and are as long or nearly as long as the spikelet. The lemma has a long awn nearly as long as that of the glumes. The 2- to 6-cm-long purplish awns are distinctive. Awns and glumes are lined with minute, rough teeth that you can easily feel if you push your fingers down along the awns.
Habitat: Foxtail Barley grows at all elevations except in the alpine zone. It is common along roadsides, in moist meadows, and along lakeshores. It tolerates alkaline or brackish soils, and it favours disturbed sites in urban and suburban settings. Most people are surprised to hear this species described as a native grass. It is described as circumpolar and weedy.
Similar Species: The distinctive whisk-shaped flowerhead is unmistakable. The flowerhead of Meadow Barley is long, narrow, and not whisklike or drooping.



Koeleria, a genus that occurs in the Temperate to Arctic areas of North America and Eurasia, is named after George Koeler, the author of a book on grasses of France and Germany. This is the only species listed by Douglas et al. (1994) as occurring in British Columbia but there has been some debate as to what to call this species. In their publication *Flora of the Pacific Northwest*, Hitchcock et al. (1969) describe *Koeleria macrantha* as one of the most variable species in the Pacific Northwest.

Koeleria macrantha (Ledeb.) J.A. Schultes f.
Koeleria cristata Pers.
Junegrass

Plant: *Koeleria macrantha* is a native species that grows 30–60 cm tall. It is a densely tufted perennial with most of the leaves arranged around the base of the stem. The flowerhead has the appearance of a slightly open spike. It has short branches, but they do not spread.
Leaves and Stem: The sheaths are open and the stems are smooth or downy. At the collar of the leaf-margin interface, there are often straight hairs that are 1–1.5 mm long. The 0.5- to-2-mm-long ligules are highest in the front and very hairy along the edge. The leaf blades are 1–2 mm wide and usually in-rolled or folded. They can be covered in short hairs or smooth with minute rough hairs. The tips of the leaf blades are boat-like.
Flowerhead and Flowers: The flowerhead is 4–13 cm long and has short branches that point upward. There are mostly two flowers in each spikelet, but occassionally there are up to four. The unequal glumes do not have awns but have a rough appearance on the back and equal or exceed the first flower. The rough lemmas are awnless or have a short awn tip.
Habitat: Junegrass grows on dry, open sites in the steppe to subalpine zones. It is common from the Flathead River to Invermere, Radium, and Spillimacheen. It is one of the better range grasses, but it rarely occurs in abundance and does not have as much foliage as some of the other range grasses.
Similar Species: Junegrass is highly variable and many authors consider the genus to contain several species. It is often confused with Fendler's Bluegrass (*Poa fendleriana*). It can be separated from Fendler's Bluegrass by the smaller spikelets, entirely colourless paleas, and the hairy stem axis of the flowerhead.



In Hitchcock's *Manual of Grasses of the United States* (1951) there was no genus called *Leymus*—the members of this genus were included in *Elymus*, a genus in which the stem axis does not come apart at maturity and has more than one spikelet at each node. The two taxa differ in preferred site characteristics, with *Leymus* growing in open, dry areas, and *Elymus* growing in moist areas. The leaf blades of *Leymus* appear to be more strongly and closely ribbed than those in *Elymus* (Barkworth 1998). This gives *Leymus* a stiff, harsh feel as compared to *Elymus*, which has a softer feel. Douglas et al. (1994) separate *Leymus* from *Elymus* based on *Leymus* having no lemma awns and having rhizomes (*Elymus* are tufted). There are three species of *Leymus* in British Columbia: *Leymus cinereus*, *L. innovatus* and *L. mollis*.

***Leymus*—Adapted from Barkworth in Douglas et al. (1994)**

1a. Plants with a strong rhizome; lemmas obviously and evenly hairy across the back ..... *Leymus innovatus*

1b. Plants tufted, short or no rhizome; lemmas smooth or with scattered hairs across the back ..... *Leymus cinereus*

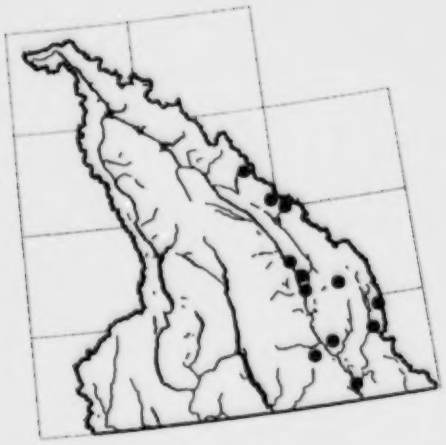
Leymus cinereus (Scribn. & Merr.) A. Love
Elymus cinereus Scribn. & Merr.
Giant Wildrye

Plant: *Leymus cinereus* is a native species that grows 1–2 m tall. It is a coarse, tufted perennial, with short rhizomes connecting the clumps of grass, which are up to 1 m wide. The flowerhead is a large stiff spike with three spikelets at each node.
Leaves and Stem: The open sheaths are smooth to softly hairy and the auricles are well developed. Stems are hairy at the nodes. The membraneous ligules are 3–7 mm high and softly hairy. Large, tough, flat leaf blades are 10–20 mm wide.
Flowerhead and Flowers: The stiff spike flowerhead is 12–20 cm long. Spikelets are sometimes paired but most often occur as three at each node. The nearly equal, narrow glumes are tapered from the base and often as long as the spikelet. Smooth to hairy lemmas have no awn, or may have an awn that is 2–7 mm long.
Habitat: Giant Wildrye commonly grows along the saline margins of ponds or seeps and occasionally on dry, gravelly or sandy sites in the steppe or montane zones. In the Columbia Basin region, Giant Wildrye occurs at Cranbrook, Marysville, Radium Hot Springs, Wasa, and Canal Flats.
Similar Species: Giant Wildrye is similar to Fuzzy-spiked Wildrye (*Leymus innovatus*), and both species are found in the Columbia Basin region. There is a difference in plant habit and size between the two species. Giant Wildrye is tufted and 1–2 m tall, compared to Fuzzy-spiked Wildrye, which is rhizome- bearing and 40–100 cm tall. T.C. Brayshaw (pers. comm. 1999) believes that Giant Wildrye may also be rhizomatous in disturbed sites. The lemmas of Giant Wildrye are smooth or slightly hairy, whereas those of Fuzzy-spiked Wildrye are always hairy.

Leymus innovatus (Beal) Pilger
Elymus innovatus Beal
Fuzzy-spiked Wildrye

Plant: *Leymus innovatus* is a native species that grows 40–100 cm tall. It is a tufted perennial with a rhizome, and an erect, soft-hairy spike.
Leaves and Stem: The open sheath has short, stiff hairs and the auricles are well developed. The ligules are less than 1 mm long and short-hairy along the upper edge. Stiff, inrolled leaf blades are 2–4 mm wide. The upper leaf surface is rough and the lower leaf surface is smooth. The stems are slightly hairy just below the nodes.
Flowerhead and Flowers: The stiff, spike-like flowerhead is 4–9 cm long and often the lowermost spikelet is widely separated from those above. The stalkless purple spikelets contain three to five flowers. The stiff, hairy glumes are very narrow with 5- to 12-mm-long awns. Dense, short hairs cover lemmas with awns up to 3 mm long.

Habitat: Fuzzy-spiked Wildrye grows in slightly moist to dry meadows and forests in the montane zone—it is common in British Columbia, east of the Coast-Cascade Mountains. In the Columbia Basin region, Fuzzy-spiked Wildrye occurs at Kootenay, Mount Shanks, Mount Granger, Fairmont Hot Springs, Cranbrook, Natal, Windermere Lake, and Vermillion Range.
Similar Species: Fuzzy-spiked Wildrye is sometimes confused with Blue Wildrye (*Elymus glaucus*). They are different in that Blue Wildrye has long awns, and smooth glumes and lemmas, but does not have a rhizome.



The genus *Lolium* consists of Old World species, and in North America they are weedy species or escapees from cultivation. *Lolium* is the Latin word for ryegrass. *Lolium multiflorum* and *L. perenne* occur in the Columbia Basin region, and are used extensively in pasturage as well as in seed mixtures for roadside restoration. A third weedy species, *L. temulentum* occurs in British Columbia but has not been collected in the Columbia Basin region. A quick field check to determine if the grass is *Lolium* is to look to see if there are two glumes or not. *Lolium* spikelets are oriented so that one edge of the spikelet is along the spike axis and along this edge there is no glume (you will need to remove the spikelet to check this). *Lolium* forms hybrids with *Festuca* and is closely related to that genus.

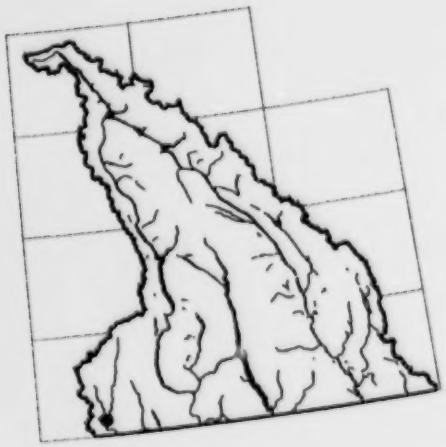
***Lolium*—Adapted from Douglas et al. (1994)**

1a. Lemmas awnless ..... *Lolium perenne*
1b. Lemmas awned ..... *Lolium multiflorum*

Lolium multiflorum Lam.
Italian Ryegrass

Plant: *Lolium multiflorum* is an introduced species that grows to 105+ cm tall. It is a biennial or tufted perennial with a flat, spike-like flowerhead.
Leaves and Stem: The coarse-growing stout stems are rounded to slightly flattened in cross-section. Sheaths are open. Leaf blades are 3–8 mm wide, 15–22 cm long, inrolled when young (but becoming flat), and drooping from the point of attachment to the sheath. Ligules are short, often no more than a scruffy fringe of tissue. Clearly visible, curved auricles are present.
Flowerhead and Flowers: In the single spike-like flowerhead, the spikelets are attached edgewise directly to the stem (no stalklets). Flowerheads may reach 30 cm long. The 8- to 10-flowered spikelets are flattened. The two, narrow glumes are 1/3 to 1/2 as long as the spikelets. Some of the lemmas (especially the upper ones) may bear awns 2+ mm long.

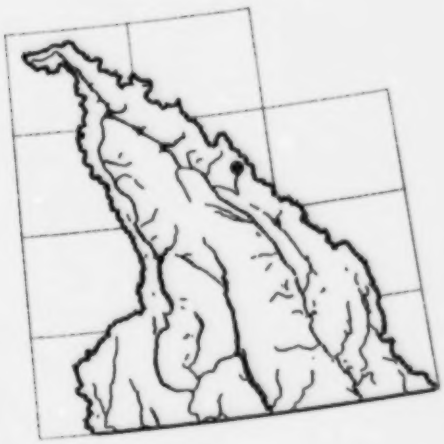
Habitat: Italian Ryegrass grows in disturbed sites, roadsides, fields, and pastures and is used in seed mixtures as a quick cover crop. There is only one specimen in the collection at the Royal B.C. Museum from the Columbia Basin region—it is from Rock Creek.
Similar Species: Italian Ryegrass closely resembles its near-relative Perennial Ryegrass, and the two form hybrids. Italian Ryegrass is a rougher- or coarser-looking plant, has awns, and has glumes much shorter than the spikelet compared to Perennial Ryegrass. Some *Lolium* species appear similar to *Agropyron* species, but the spikelets of *Lolium* species are attached edgewise to the stem, whereas those of *Agropyron* species are attached flatwise.



***Lolium perenne* L.**
Perennial Ryegrass

Plant: *Lolium perenne* is an introduced species that grows 30–80 cm tall. It is a tufted short-lived perennial with rhizomes and a spike-like flowerhead.
Leaves and Stem: Smooth stems arise from numerous young leaves at the base. Stems below the flowerhead are flattened. Sheaths are open. Flat to folded, sometimes inrolled, leaf blades are 2–4 mm wide, glossy, and hairless. Tips of the leaves may be prow-like. Ligules are only about 1 mm high. Clearly visible auricles up to 1.5 mm long occur on most leaves.
Flowerhead and Flowers: The flowerhead is stout, 7–25 cm long, and spike-like with spikelets alternating up the axis. Spikelets are attached edgewise directly to the stem (no stalklets). The 6- to 10-flowered spikelets are flattened. The narrow glume reaches about 1/2 the length of the spikelets. Lemmas are sharp-pointed, but there are no awns.
Habitat: Perennial Ryegrass grows on disturbed sites, pastures, fields, lawns, roadsides, and even clearings. This species was introduced from Europe and is used in seed mixtures as a quick cover and pasture crop. There is only one specimen in the Royal BC Museum's collection from the Columbia Basin region, and it is from Emerald Lake.

Similar Species: The most noticeable difference between Perennial Ryegrass and Italian Ryegrass is that Perennial Ryegrass has awnless lemmas.

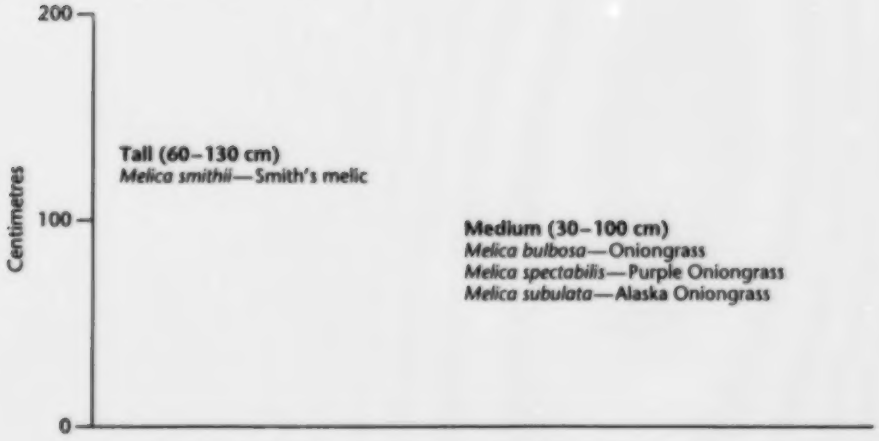


The name *Melica* comes directly from the Italian name for a kind of sorghum. The genus *Melica* resembles *Bromus* in the overall appearance of the flowerhead, which may vary from a form with open spreading branches to a tight, slightly closed spike. To confuse things even more, *Melica smithii* has two small teeth at the tip of the lemma where the awn meets the lemma, which is a standard character used to differentiate *Bromus* from other genera. The two genera differ in that *Melica* has spikelets with two to four sterile flowers above the fertile flowers and these are almost like scales. This gives the spikelet a more pointed or sometimes a more open appearance because the lemma is not full. The glumes are shorter than the first lemma and are thin, papery, and transparent. The sheath is closed to near the point where it meets the blade. The ligules are membrane-like and often closed in the front. In addition, there are no auricles and the callus is not bearded. This genus has a few species that are bulbous at the base of the stem. Important features to look for are the bulbous stem base and whether or not awns are present. Three of the four species of *Melica* found in the Columbia Basin region are Blue listed by the B.C. Conservation Database Centre in Douglas et al. (1998). In some cases this rarity is the result of the type of specialized habitat requirements of the species. In other cases, the species are at the limit of their range. In the case of *Melica smithii*, most of its range lies east of the Rockies. *M. spectabilis* is at the northern limit of its range, which extends east of the Cascades to the south and includes southwestern Alberta.

***Melica*—Adapted from Douglas et al. (1994)**

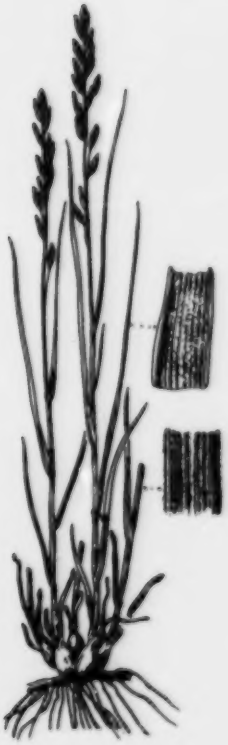
1a. Lemmas awned ..... *Melica smithii*
1b. Lemmas unawned or awns inconspicuous 2
2a. Lemmas tapering with a long sharp tip; lemmas hairy along the veins ..... *Melica subulata*
2b. Lemmas rounded; lemmas smooth or appearing rough 3
3a. Glumes less than 1/2 the length of the spikelets; basal bulbs not clustered, but remain attached to the rhizome ... *Melica spectabilis*
3b. Glumes more than 1/2 the length of the spikelets; basal bulbs clustered, not attached to the rhizome ..... *Melica bulbosa*

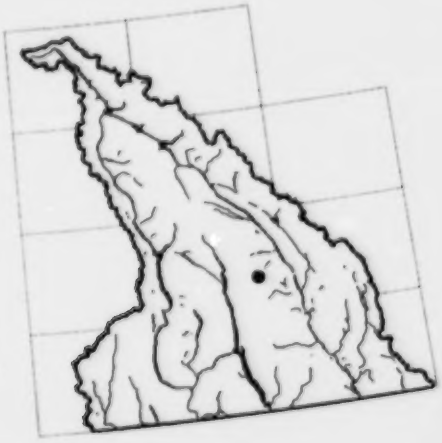
Heights of *Melica* species



Melica bulbosa Geyer ex Porter & Coult.
Oniongrass

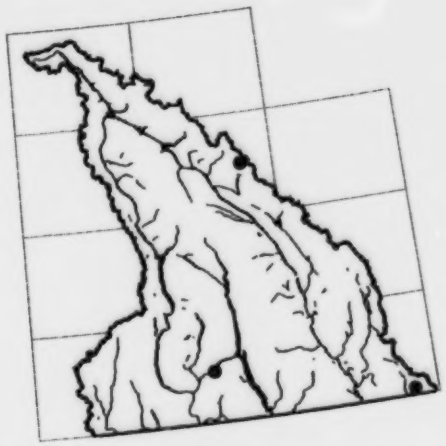
Plant: *Melica bulbosa* is a native species that grows 30–100 cm tall. It is a strongly tufted perennial with bulbous-based stems clustered on short rhizomes. The flowerhead is long and narrow with short, thick branches that are upward-pointing and pressed close to the stem axis.
Leaves and Stem: The sheaths are closed almost their full length and feel rough because they are covered in tiny, stiff projections. The ligules are 3–4 mm long, membrane-like, and open in the front, and have ragged edges. Rough, flat leaves are somewhat inrolled and 2–4 mm wide.
Flowerhead and Flowers: The flowerhead is narrow and 10–16 cm long, and has thick branches that are short and pressed close to the stem axis. The spikelets range from one to several per branch and they overlap. The glumes are narrow, blunt, and papery and are slightly shorter or equal in length to the first flower. The rough lemmas have stiff hairs or, in some cases, bumps. The sterile upper flowers consist only of empty lemmas. There are no awns.
Habitat: Oniongrass grows on moist to dry slopes in the steppe and alpine zones. It is a Blue-listed species (Douglas et al. 1998) and occurs in the Columbia Basin region in the Toby Creek area.
Similar Species: There are three species of *Melica* with bulbous stem bases in the Columbia Basin region: Purple Oniongrass (*M. spectabilis*), Alaska Oniongrass (*M. subulata*), and Oniongrass. Purple Oniongrass has bulbous bases that are spread out along the rhizome as single stems, and the bulb appears to be attached by a short stalk that may sometimes be hidden in the bulb scales. Alaska Oniongrass has tightly clustered bulbs. Oniongrass has bulbous bases that are attached in a clump directly to the rhizome.





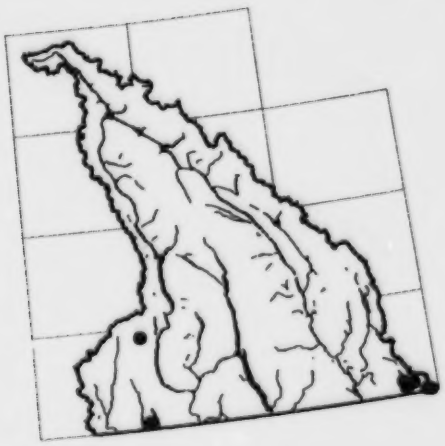
Melica smithii (Porter) Vasey
Smith's Melic

Plant: *Melica smithii* is a native species that grows 60–130 cm tall. It is a tufted perennial without bulbous bases on the stem. The open flowerhead spreads or droops.
Leaves and Stem: The closed sheaths are smooth or slightly hairy. The ligules are 3–9 mm high and blunt and have a coarsely ragged edge. There are no auricles, and the collar is smooth to short hairy. The rough-feeling flat leaf blades are lax and 5–10 mm wide, and have widely spaced veins.
Flowerhead and Flowers: The open flowerhead has long, drooping branches and spikelets at the ends of the branches. The narrow, pointed glumes are papery and shorter than the first lemma. The finely hairy lemmas have two teeth at the tip, and a 3- to 10-mm-long awn.
Habitat: Smith's Melic grows in moist forests in the lowland and montane zones. It is a Blue listed species on the B.C. Conservation Data Centre's database. It is found in the Columbia Basin region at Yoho National Park and Mount Langemark in the Flathead area.
Similar Species: Smith's Melic resembles *Bromus* because it has long awns, a spreading flowerhead, and two teeth at the tip of the lemma. The occurrence of empty lemmas that enfold one another, absence of auricles, and sheaths that are closed for their full length help identify *Melica*. *Bromus* species have open sheaths (at least part of the way) and auricles. If there are sterile lemmas, they do not enfold one another.



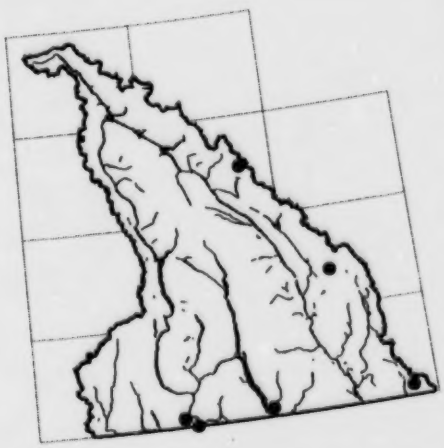
Melica spectabilis Scribn.
Purple Oniongrass

Plant: *Melica spectabilis* is a native species that grows 30–80 cm tall. It is a perennial with rhizomes and bulbous bases on the stems. The narrow flowerhead has upward-pointing branches.
Leaves and Stem: The rough sheath ranges from open for 3–10 mm to completely closed. Stem bases are bulbous; not clustered at one place but spaced along the rhizome. The ligules are 1–3 mm high, collar-like, open in the front, and ragged along the upper edge. The leaf blades are 2–4 mm wide and mostly flat, but sometimes slightly inrolled. There are no auricles.
Flowerhead and Flowers: The narrow flowerhead is 7–15 mm long, and has slender branches pressed close to the stem axis. The somewhat compressed spikelets are often purplish. The glumes are papery or rough, unequal, and rounded across the back. They are 1/2 the size of the first lemma. Blunt lemmas have a rounded back, marked nerves, and a rough texture.
Habitat: Purple Oniongrass grows in open moist forests and in wet meadows in montane to subalpine zones. In the Columbia Basin region it occurs at Mount Langemark, Wall Lake, Mount Morrissey, and Procter Lake and in the Monashee Mountains.
Similar Species: Purple Oniongrass is similar to Oniongrass, except that Purple Oniongrass has glumes less than 1/2 the length of the spikelets, and a bulbous base of the stems that are not clustered (they may have short stem-like attachments). The stem bases of Oniongrass are clustered and attached directly to the rhizome.



Melica subulata (Griseb.) Scribn.
Alaska Oniongrass

Plant: *Melica subulata* is a native species that grows 30–100 cm tall. It is a tuft-forming perennial with short, thick rhizomes. Clustered stems bases are bulbous and look like bunching onions. The flowerhead is open and loose.
Leaves and Stem: Sheaths are closed nearly to the top. The long, flat, thin leaf blades are 3–7 mm wide and are distributed along the stem. The upper surface is hairy. There is no auricle. The ligule is 1–5 mm long, hairless, and jagged or split along the edge.
Flowerhead and Flowers: The open but narrow, sometimes droopy flowerhead bears mostly single, narrow spikelets that are 12–20 mm long on the ends of thin branches. Two, unequal, relatively large glumes enclose two to five flowers. There are no awns on the glumes or the lemmas. The flowers extend well beyond the ends of the glumes. The lemmas are long and sharply pointed, but have no awns. The lower lemma margins and nerves are hairy.
Habitat: Alaska Oniongrass grows widely in dry to moist meadows and slopes, woods, streambanks, and floodplains. This is a species of moist woodland margins or slightly shady sites in our region, rather than of open, dry sites. In the Columbia Basin region, Alaska Oniongrass grows along the Pend d'Oreille River, in Yoho National Park, and at Rossland.
Similar Species: The long, pointed lemmas with hair over the raised veins distinguish this species from the other bulbous-based melics.



This genus was named after G.H. Muhlenberg (1753–1815), who was a dedicated grass student. Although palatable, *Muhlenbergia* species are seldom considered to be an important forage grass. The habit of this genus ranges from perennial and strongly rhizomatous to annual. The genus contains members that have very open to tightly closed flowerheads. The leaf sheaths are open to the base, there are no auricles, and the ligules are membranous. There are seven species of *Muhlenbergia* in British Columbia; five are known from the Columbia Basin region.

***Muhlenbergia*—Adapted from Douglas et al. (1994)**

1a. Flowerhead spread open and branching; branchlets long and very slender ..... *Muhlenbergia asperifolia*

1b. Flowerhead narrow (less than 2.5 cm wide); branchlets short, pressed close to the flowerhead axis 2

2a. Lemmas not hairy at the base; leaves narrow 3

3a. Perennial with rhizomes; stems with nodules... ..... *Muhlenbergia richardsonis*

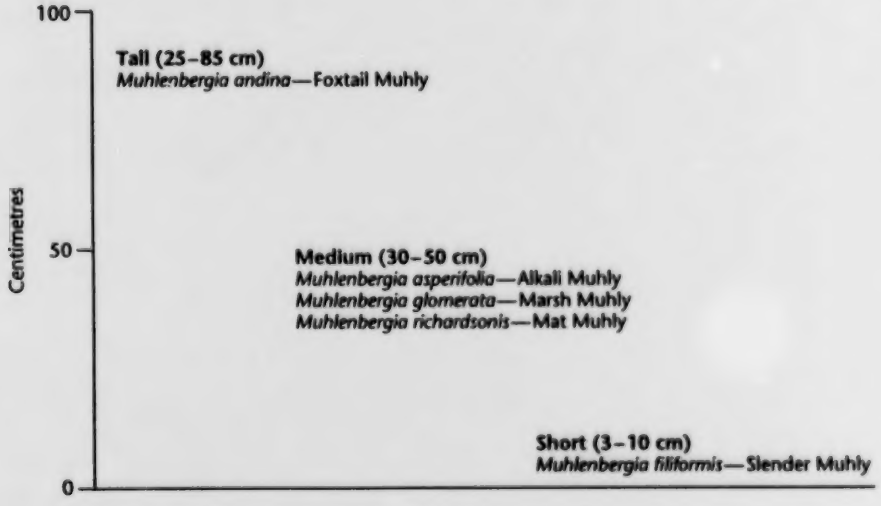
3b. Annual; stems often rooting at lower nodes... ..... *Muhlenbergia filiformis*

2b. Lemmas hairy or bearded at the base; leaves 2–6 mm wide 4

4a. Lemma hairs long (2–3 mm); lemmas awned... ..... *Muhlenbergia andina*

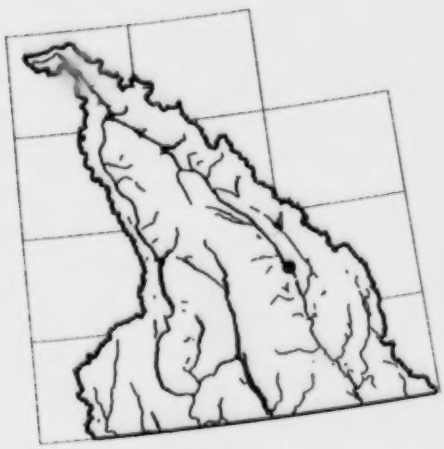
4b. Lemma hairs short (less than 1.5 mm); lemmas awn-tipped... ..... *Muhlenbergia glomerata*

Heights of *Muhlenbergia* species



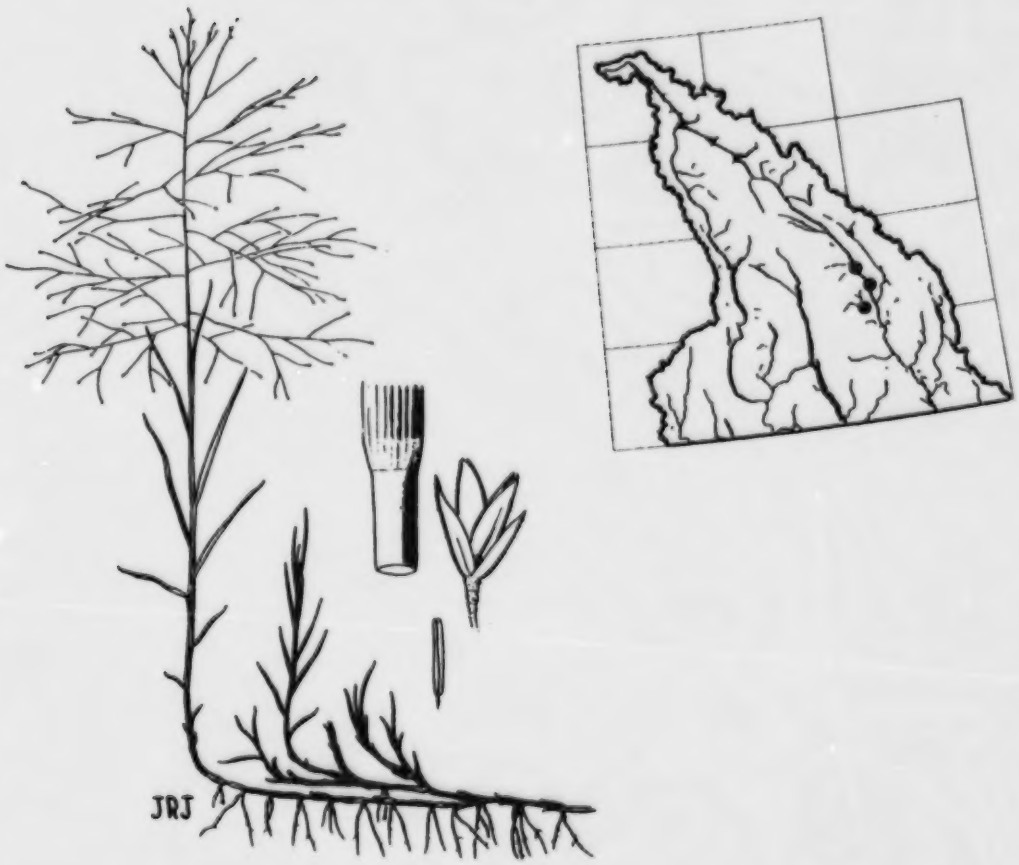
Muhlenbergia andina (Nutt.) A.S. Hitchc.
Foxtail Muhly

Plant: *Muhlenbergia andina* is a native plant that grows 25–85 cm tall. It is a perennial with a creeping rhizome and a narrow, loosely flowered flowerhead.
Leaves and Stem: Sheaths are open to the base and there are no auricles. The ligule is 0.5–1.5 mm high and blunt, with fine hairs along its edge. The flat leaf blades are 2–4 mm wide.
Flowerhead and Flowers: The flowerhead is narrow and 2–25 cm long. It consists of a few widely spaced spikelets (this accounts for the wide range of lengths) and branches that are pressed close to the flowerhead axis. The sharp-pointed glumes have an awn-like tip. The lemmas have noticeable hairs at the base, and an awn that is 4–10 mm long.
Habitat: Foxtail Muhly grows in moist canyons, along streambanks, and near hot springs in the steppe and montane zones. In the Columbia Basin region it has been collected only at Fairmont Hot Springs. Foxtail Muhly is Red listed in Douglas et al. (1998). There are no specimens of this species in the Royal BC Museum's collection. We have included a description of it because the historical record for *Muhlenbergia andina* is from the Columbia Basin region.
Similar Species: Foxtail Muhly has not been seen at Fairmont Hot Springs for many years, and may be extinct in the Columbia Basin region, therefore nearly eliminating the chances of confusing it with any other species.



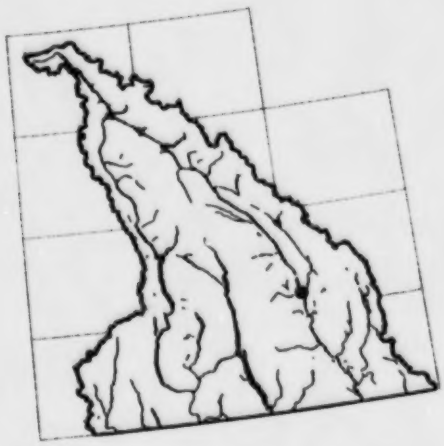
Muhlenbergia asperifolia (Nees & Meyen) Parodi
Alkali Muhly

Plant: *Muhlenbergia asperifolia* is a native species that grows 10–40 cm tall. It is a perennial with rhizomes, an open, finely branched flowerhead, and tiny spikelets at the ends of the branches.
Leaves and Stem: The stem is solid—not hollow—and slightly flattened. The open sheaths are slightly keeled and appear to overlap one another. There are no auricles, and the membranous ligules are blunt, 0.5–1 mm high, and finely hairy along the edge. The flat leaf blades have rough edges and are about 1.5–2 mm wide.
Flowerhead and Flowers: The open and long flowerhead extends almost 1/2 the length of the whole plant (5–20 cm long). Spikelets are commonly one- and two-flowered. The unequal glumes are slightly rough along the keel. The lemma is longer than the glumes and has an awn at the tip that is less than 0.5 mm long.
Habitat: Alkali Muhly, as the name implies, grows in wet alkaline muds or seeps in open meadows and around hot springs. In the Columbia Basin region it occurs at Fairmont Hot Springs, Windermere, and Whitetail Lake.
Similar Species: Alkali Muhly may appear at first glance to resemble a *Panicum* grass, especially because of the open flowerhead and fine branches with small spikelets, but *Panicum* has only one flower to each spikelet, whereas Alkali Muhly can have one or more.



Muhlenbergia filiformis (Thurb.) Rydb.
Slender Muhly

Plant: *Muhlenbergia filiformis* is a native species that grows 3–10 cm long. It is an annual that forms perennial-looking mats because the stems run along the ground and root at the nodes. The flowerhead is narrow and has irregular spikelet placement.
Leaves and Stem: The stems are solid and the smooth sheaths are open. Membranous ligules range from blunt to pointed, and are 1–3 mm long. The flat leaf blades are 1–2.5 mm wide and often hairy on the underside. There are no auricles.
Flowerhead and Flowers: The narrow flowerhead has irregularly placed spikelet branches, and sometimes there are gaps along the stem. The nearly equal, tiny, blunt glumes are shorter than the lemma, which is more or less hairy and has a sharp point with an awn-like tip.
Habitat: Slender Muhly grows in lime-rich, moist seeps in open meadows. It occurs at Canal Flats in the Columbia Basin region.
Similar Species: Slender Muhly may at first sight resemble Mat Muhly (*M. richardsonis*), but Slender Muhly is an annual, and it is smaller than Mat Muhly.



Muhlenbergia glomerata (Willd.) Trin.
Marsh Muhly

Plant: *Muhlenbergia glomerata* is a native species that grows 30–50 cm tall. It is a perennial with elongate, slender rhizomes and a narrow, spike-like flowerhead.

Leaves and Stem: The open sheaths have no auricles. Stem internodes have rough hairs that point backwards. The flat leaves are 2–6 mm wide and rough to the touch.

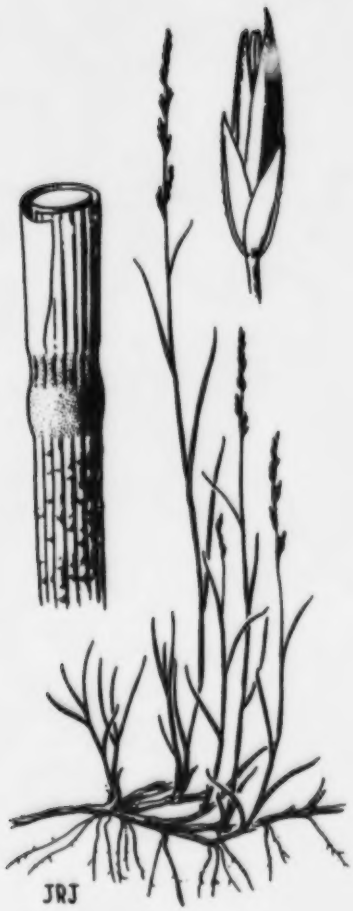
Flowerhead and Flowers: The narrow, spike-like flowerhead is 2.0–6.5 cm long. The glumes are awl-shaped and longer than the lemmas. The first glume is about 3/4 the length of the second. Glume awns are as long as the glume body. The lemma has scattered hairs on the lower part, and is awn-tipped.

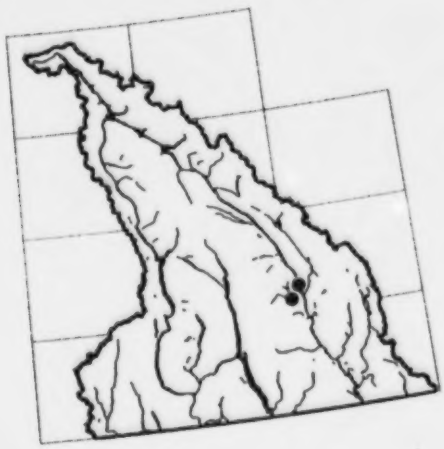
Habitat: Marsh Muhly is a species of boreal North America ranging from Newfoundland to British Columbia and into the northern U.S. It is a Blue-listed species in Douglas et al. (1998), but occurs more commonly than Slender Muhly. In British Columbia it grows on lime-rich seeps, moist meadows, and floodplains in the steppe and montane zones. In the Columbia Basin region it has been collected at Fairmont Hot Springs, Canal Flats, and Pilot Bay Provincial Park.

Similar Species: Marsh Muhly is difficult to separate from Wirestem Muhly (*M. mexicana*) and Satin Grass (*M. racemosa*), but neither of these species has been collected from the Columbia Basin region.

Muhlenbergia richardsonis (Trin.) Rydb.
Mat Muhly

Plant: *Muhlenbergia richardsonis* is a native species that grows 20–40 cm tall. It is a tufted or matted perennial with narrow leaves, a scaly rhizome, and a narrow, spike-like flowerhead.
Leaves and Stem: The leaf sheaths are open. The roughened stem is solid and slightly flattened. Sharply pointed ligules are 1–3 mm long and rough to hairy at the edges. Inrolled leaf blades are 1–1.5 mm wide. The leaves are blue-green rather than yellow-green.
Flowerhead and Flowers: The flowerhead is narrow, 5–7 cm long, and spike-like. The spikelet branches appear scattered along the spike axis. The glumes are tiny but broad, about 1 mm long (much shorter than the lemma), and do not have a sharp point. They have a clearly noticeable midvein that is lightly covered in short, stiff hairs or bumps. The first glume is slightly shorter than the second. The lemma is 2.5 mm long, has no hairs at the base, and is not bearded or hairy. The lemma also has a rough, minutely awned tip.
Habitat: Mat Muhly grows on lime-rich sites such as moist meadows, terraces, and gravel bars in the steppe and montane zones. In the Columbia Basin region it occurs at Armstrong Bay and the terrace above Findlay Creek.
Similar Species: Mat Muhly resembles Slender Muhly, but is much larger, has a perennial habit, and grows from a rhizome.





In this paper, we treat *Oryzopsis* as a monotypic genus endemic to North America, consisting only of *Oryzopsis asperifolia.* Barkworth (1998) has placed the remaining species in *Piptatherum.* The name *Oryzposis* comes from the Greek *oryza,* meaning rice, and *opsis,* meaning appearance, in reference to its resemblance to rice. *Oryzopsis* is separated from *Piptatherum* on the basis of the overwintering basal leaves that remain green, the reduced stem leaves (<1 cm long), and a dense ring of callus hairs. *Piptatherum* has basal leaves that die in winter, stem leaves that are longer than 1 cm, and callus hairs that are scattered if present. *Oryzopsis* also resembles *Stipa,* but has a shorter callus and awns. *Oryzopsis* is nutritious and palatable, but not generally a grass that is important as forage.

Oryzopsis asperifolia Michx.
Rough-leaved Ricegrass

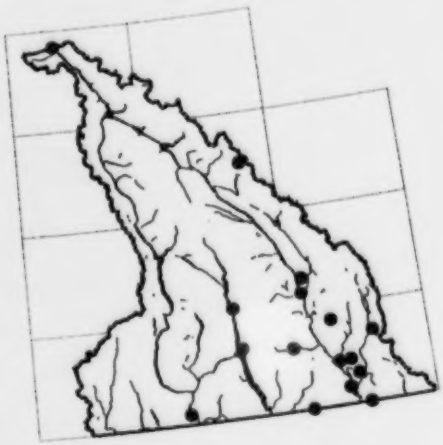
Plant: *Oryzopsis asperifolia* is a native species that grows 20–50 cm tall. It is a loosely tufted perennial with a flowerhead that is reduced to a simple one-sided spike.

Leaves and Stem: Sheaths are open to the base and there are no auricles. Blunt, membrane-like ligules are 0.5 mm high and have a margin of tiny hairs. The basal leaves are 4–10 mm wide, flat or inrolled, lax, and rough to the touch. They remain green over winter. The stem leaves are less than 1 cm long.

Flowerhead and Flowers: The flowerhead spikelets are 5–12 cm long and crowded into a spike. The flowerhead appears as if the spikelets are arranged on one side of the stem. There is only one flower in each spikelet. The glumes are smooth and extend into a short hair at the tip. The first glume is slightly shorter than the second. The hardened lemma equals the glume and has short, whitish hairs scattered on its surface. The edges of the lemma overlap at maturity and the palea is hidden. The lemma extends into a 7- to 10-mm-long awn.

Habitat: Rough-leaved Ricegrass is a native species that grows on dry, gravelly soil such as talus slopes, or in mixed woods in moist depressions. Rough-leaved Ricegrass grows in solitary, bright green tufts that are scattered throughout the site in all seasons (G. Berg, pers.comm. 1999). In the Columbia Basin region it occurs in Yoho National Park, along the Kootenay River, and at Valemont.

Similar Species: The short-stem leaves of Rough-leaved Ricegrass, as well as the evergreen basal leaves, differentiate it from other species.



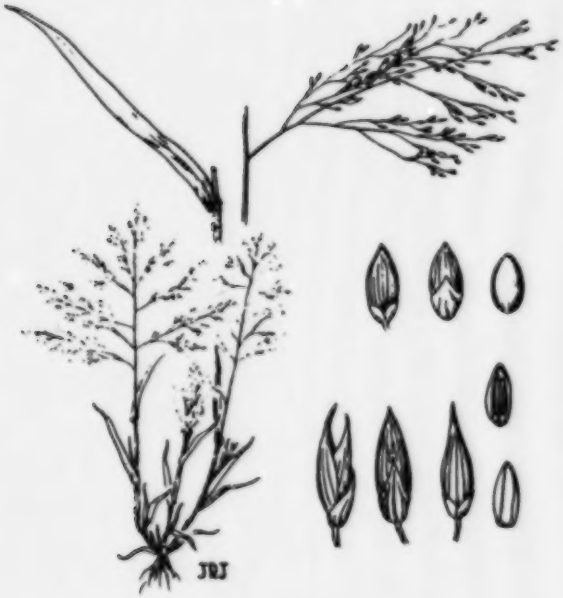
Panic grasses are part of a large, mainly tropical and subtropical genus. Only three species occur in the Columbia Basin region of British Columbia: *Panicum capillare*, *P. occidentale*, and *P. oligosanthes* var. *scribnerianum*. The word *panicum* is Latin for millet—a common name used for several *Panicum* species. An interesting feature of the *Panicum* species is the variation in appearance as the season progresses. Initially, the flowerhead is extended well out of the sheath, but as the season progresses the later-emerging flowerheads do not extend as far out of the sheath, and in some cases the sheath encloses half the flowerhead.

Panicum

1a. Plants annual; lemma tip pointed ..... *Panicum capillare*
1b. Plants perennial; lemma tip rounded or blunt **2**
  2a. Spikelets 3.2 mm long ..... *Panicum oligosanthes* var. *scribnerianum*
  2b. Spikelets rarely 2 mm long ..... *Panicum occidentale*

***Panicum capillare* L.**
Common Witchgrass

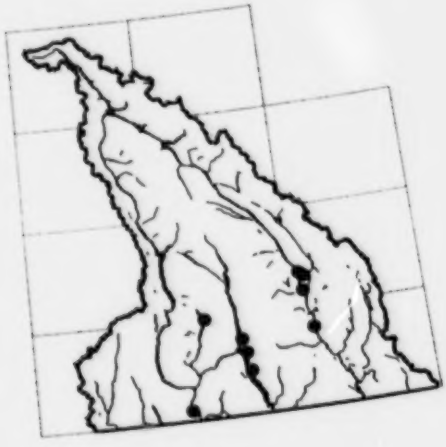
Plant: *Panicum capillare* is a native species that grows 20–70 cm tall. It is an annual that appears to be bent at the base. The flowerhead is open and repeatedly branched, with single, small spikelets at the end of each branch.
Leaves and Stem: The stem and open sheaths have 2- to 4-mm-long hairs spread abundantly throughout. The ligules are 1.5–2 mm long and consist entirely of hairs. Flat leaf blades are 5–12 mm wide. There are no auricles.
Flowerhead and Flowers: The open flowerhead has widely separated branches, and their length is 10–30 cm. The first glume is three-nerved and 1/2 as long as the spikelet. The pointed second glume is seven-nerved and as long as the sterile lemma, which is nine-nerved; both exceed the fertile lemma. The first lemma is sterile and the second lemma is hardened and fertile.
Habitat: Common Witchgrass occupies moist to dry roadsides, railway embankments, gravelly slopes, and fields in lowland to montane zones. In the Columbia Basin region it occurs at Midway, Kokanee Glacier Park, Trail, Hidden Lake, and Mud Lake.
Similar Species: Common Witchgrass differs from other *Panicum* species in that the first glume is 1/2 as long as the spikelet, and the tip of the glume is pointed.



Panicum occidentale Scribn.
Dicanthelium lanuginosum (Elliot) Gould
Panicum pacificum Hitch.& Chase
Panicum thermale Boland
Western Witchgrass

Plant: *Panicum occidentale* is a native species that grows 15–40 cm tall. It is a tufted, velvety, greyish green perennial with an open, branching flowerhead.
Leaves and Stem: The open sheaths are densely hairy and there are no auricles. The ligule is 3–4 mm long and consists of a ring of hairs. The flat, firm leaves are 5–10 mm wide and have a hairy lower surface. The upper leaves are slightly larger than the basal leaves.

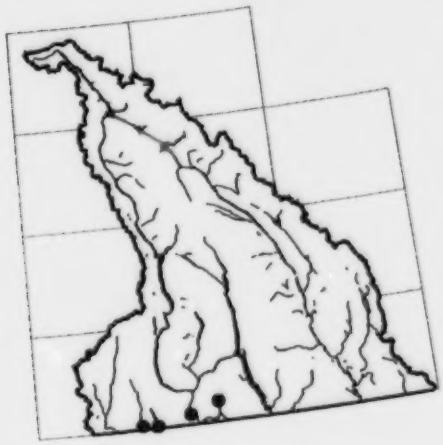
Flowerhead and Flowers: The flowerhead is open, 3–9 cm long, and almost as wide as it is long. Elliptic or oblong spikelets with short hairs contain two flowers in each spikelet. The spikelets are rarely 2 mm long. The glumes are much shorter than the first flower. The lower flower is sterile, whereas the upper flower is fertile and the lemma hardened. The sterile lemma and the second glume are both rounded at the tip.
Habitat: Western Witchgrass grows on moist to dry shores, beaches, open woods, meadows, and bogs in the lowland to montane zones. In the Columbia Basin region it occurs at Castlegar, Christina Lake, Wasa Lake, Fairmont Hot Springs, Windermere Lake, Canal Flats, Kootenay Lake, and Hahas Lake.
Similar Species: Few-flowered Witchgrass (*P. oligosanthes*) resembles Western Witchgrass, but prefers drier habitats, and has shorter ligules, longer spikelets, and fewer branches. Western Witchgrass is variable in the West, and a complete description of the complex in western North America is contained in Hitchcock et al. (1969).



Panicum oligosanthes Schult. var. ***scribnerianum*** (Nash) Fern.
Dichanthelium oligosanthes (Schult.) Gould
Few-flowered Witchgrass

Plant: *Panicum oligosanthes* is a native species that grows 15–20 cm tall. It is a hairy perennial with an open, but very short, flowerhead.
Leaves and Stem: The open sheaths are hairy and there are no auricles. Ligules stand about 1.5 mm high. The upper leaf blades are larger than the basal leaf blades, averaging 5–15 mm wide.
Flowerhead and Flowers: The flowerhead is open and 3–8 cm long, and contains hairy spikelets that are 3.2 mm long. The first glume is about 1.5 mm long and forms a hardened cup-like base for the rest of the spikelet. The second glume and the sterile lemma are rounded at the tip and barely exceed the fertile flower.

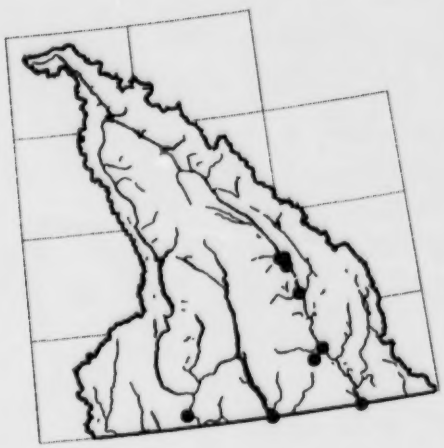
Habitat: Few-flowered Witchgrass grows on dry, open sandy flats, gravelly knolls, and rocky bluffs in lowland to montane zones. In the Columbia Basin region, Few-flowered Witchgrass occurs at Cascade, Trail, and Grand Forks.
Similar Species: Few-flowered Witchgrass resembles Western Witchgrass but prefers drier habitats and has shorter ligules, longer spikelets, and fewer branches. Both species have dense short hairs covering the second glume and the sterile lemma. Both species also have basal leaves that are distinctly different from those along the stem.



Pascopyrum is one of the new genera created by splitting up *Agropyron* to match genetic evidence (Barkworth and Dewey 1985). The name comes from the Latin *pascuum*, meaning pasture, and the Greek *pyros*, meaning wheat. The genus contains one species, *Pascopyrum smithii*, which is endemic to North America. *Pascopyrum* is very similar to *Elymus*, and is the result of a hybrid cross between *Leymus triticoides* and *Elymus lanceolatus*. In Hickman (1993), *Pascopyrum* is separated from *Elymus* because of its sharp-pointed glumes that are widest at the middle and curved to one side. *Pascopyrum* also has a blue-green colour on the leaves as well as the flowerhead. In contrast, *Elymus* has straight glumes that are widest below the middle, and the tip of the glume ranges from pointed to blunt.

Pascopyrum smithii (Rydb.) A. Love
Agropyron smithii Rydb.
Western Wheatgrass

Plant: *Pascopyrum smithii* is a native species that grows 20–100 cm tall. It is a bluish perennial that forms large clumps, and it has a spike-like flowerhead consisting of usually one, but occasionally two, spikelets per node.
Leaves and Stem: The smooth, open sheath has auricles that are 0.2–1 mm long, and clasp the stem. There is a short, membrane-like ligule. The leaf blades are 2–6 mm wide, strongly nerved and inrolled, stiff, and a pale blue-green colour.
Flowerhead and Flowers: The spike-like flowerhead bears one or two spikelets per node. The almost overlapping spikelets have 6–10 flowers. The slightly curved glumes are widest at the middle and are tapered from the base to the middle and tapered again to a sharp tip. The longer glume equals the first lemma. The lemmas are lance-shaped, rounded on the back, and either smooth or hairy, with an awn tip up to 5–15 mm long. The palea is as long as the lemma.
Habitat: Western Wheatgrass is a common grass of dry, alkaline soils and flats, such as those around Cranbrook, Canal Flats, and Fort Steele.
Similar Species: This species was part of the *Agropyron* complex. It has been moved out of that genus and put into *Pascopyrum*, which has only one species. Western Wheatgrass is very similiar to *Elymus lanceolatus* ssp. *lanceolatus*, especially in a vegetative state. The differences between the genera *Pascopyrum* and *Elymus* are the shape of the glumes, the acute tip of the glume vs the obtuse tip, and the strongly hairy vs hairy inflorescence .

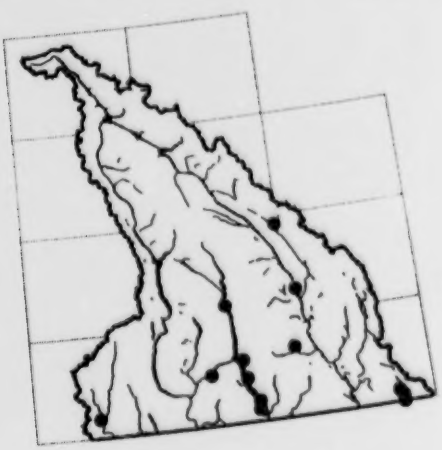


This wide-ranging genus consists of almost 20 species, mostly of the temperate regions. Its name derives from the Greek word *phalaris*, meaning a type of grass. There are two species of *Phalaris* in British Columbia, *Phalaris arundinacea* and *P. canariensis*, which has not been collected in the Columbia Basin region.

Phalaris arundinacea L.
Reed Canary Grass

Plant: *Phalaris arundinacea* is a native species that grows to over 200 cm tall. It is a robust, wide-leaved, colony-forming perennial with a rhizome and a prominent spike-shaped head.
Leaves and Stem: The stems are 70–200 cm tall and stout, and arise from long, scaly, pinkish rhizomes. The sheaths are open but the margins overlap. The leaf blades are 5–15 mm wide and flat, and feel rough. There are no auricles. The ligules are 4–10 mm long and often have a tattered, bent tip.
Flowerhead and Flowers: The flowerhead is up to 25 cm long, compact, and somewhat spike-shaped. Three-flowered spikelets are crowded onto side branches. Glumes are about the same size and enclose one fertile and two reduced, sterile flowers. Lemmas are rounded and smaller than the glumes.
Habitat: Reed Canary Grass grows widely in moist to seasonally wet sites, such as roadside ditches, the edges of swamps, marshes, and streams, wet meadows, and open seepage sites. It is common in wet areas of abandoned fields and pastures, and on disturbed sites. It is considered a native species, but introduced populations are suspected to be responsible for the weedy patches of this species. The distribution of this species circles the pole. In the Columbia Basin region it occurs at Creston, Columbia Lake, Kootenay Lake, and Kimberly, and in the Flathead area.

Similar Species: Overwintering plants form extensive beige-coloured colonies that are easy to spot in the winter and spring months. In a vegetative state, Reed Canary Grass may be confused with the other tall wetland grasses such as Common Reed (*Phragmites australis*). The ligule of Reed Canary Grass is pointed, long, and all membrane-like, whereas that of Common Reed has hair along the upper edge and is blunt rather than pointed.



There are about ten species of Timothy and all but one, *Phleum alpinum*, are Eurasian. The name *Phleum* is based on the Greek word *phleos*, the name given to a reedy grass.

***Phleum*—Adapted from Douglas et al. (1994)**

1a. Flowerhead a short wide cylinder (1–4.5 cm long); stem not bulbous at the base ..... *Phleum alpinum*
1b. Flowerhead a long narrow cylinder (4.5–13 cm long); stem bulbous at the base ..... *Phleum pratense*

***Phleum alpinum* L.**
Alpine Timothy

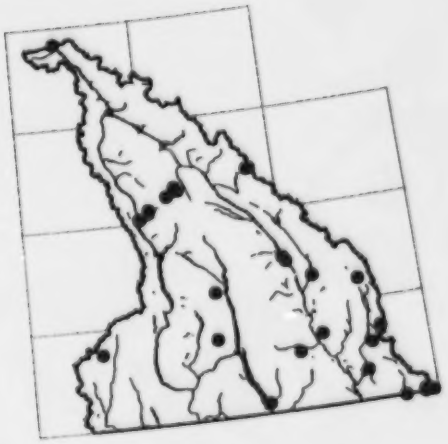
Plant: *Phleum alpinum* is a native species that grows 15–50 cm tall. It is a strongly tufted perennial, with stems that creep along the ground and appear rhizome-like. The flowerhead is 1–4.5 cm long, cylinder-like, and more than 1 cm wide when pressed.

Leaves and Stem: The stem does not have a bulbous base and often appears to bend and creep along the ground. The smooth, open sheaths often have small, rounded auricles. The ligules are 1–3 mm long, blunt, and somewhat smooth along the upper edge. The flat leaf blades reach 4–7 mm wide and are rough along the margins.

Flowerhead and Flowers: The flowerhead is 1–4.5 cm long, globular to cylinder-like, and more than 1 cm wide when pressed. The glumes have stiff hairs along the keels and are hairy along the sides. The glumes are longer than the single flower they enclose. The glumes have a somewhat distinctive rectangular body that tapers into a thick awn that is 1.5–2.5 mm long. The lemma is very short-haired and has a ragged, blunt tip.

Habitat: Alpine Timothy grows in moist meadows and along streambanks from the montane to alpine zone. In the Columbia Basin region it occurs at many locations, such as the Selkirk Range, Deadman's Pass, Yoho National Park, Meadow Mountain, Big White Mountain, Mount Broadwood, and Grizzly Mountain (to name a few).

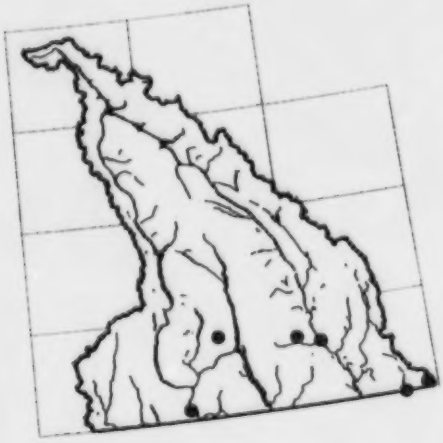
Similar Species: Alpine Timothy is similar to Common Timothy, but it differs by its lack of a stem with a bulbous base. The flowerhead of Alpine Timothy consists of a short cylinder rather than a slender, long cylinder.



***Phleum pratense* L.**
Common Timothy

Plant: *Phleum pratense* is an introduced species that grows to 1 m tall. It is a clump-forming perennial with characteristic long cylindrical, spike-like, somewhat purplish to silvery flowerheads on wiry stems.
Leaves and Stem: The slightly bulbous stem bases arise from a fibrous root mass. The stem often bends at the lower nodes. Sheaths are open, with edges inrolled. Leaf blades are 4–10 mm wide, flat, and tapering. The leaf blades on the mid- to upper-flowering stem are much shorter (3–10 cm long) than the sheaths. Auricles are absent or tiny, but ligules are well developed, 2–3 mm long, and easy to see with a hand lens.

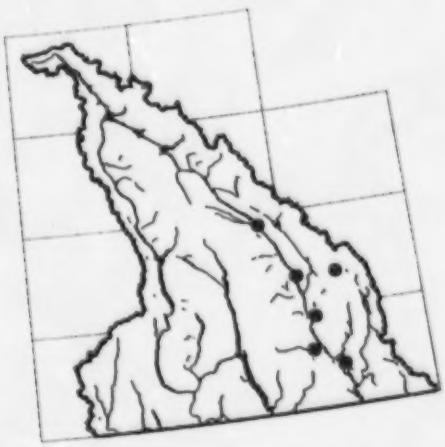
Flowerhead and Flowers: The small, flattened spikelets are packed tightly into the 4.5- to 13-cm-long unbranched flowerhead. Two equal, flattened, keeled glumes, often with dark purple nerves, enclose a single small flower. Long hairs line the keel of the glume, which extends into a short awn from the flattened top. The lemma is thin and membrane-like and its midvein extends slightly beyond the tip and resembles a short bristle.
Habitat: Common Timothy is widespread in fields, meadows, and roadsides. It is sown in pastures for forage and used in some reclamation mixtures.
Similar Species: Timothy is distinct among our grasses and not likely to be confused with other species at low elevation.



The genus *Phragmites* has three species: one native to South America, one native to Asia, and the species occurring in British Columbia that is widespread throughout the world in tropical and temperate areas. It is our tallest, and therefore most noticeable, grass species. However, the plants are too coarse to be of forage value. The name *Phragmites* comes from the Greek, meaning to grow in hedges, and probably refers to the habit of surrounding streams and ponds in areas where *Phragmites* is well established.

Phragmites australis (Cav.) Trin. ex Steud.
Phragmites communis (L.) Trin.
Common Reed

Plant: *Phragmites australis* is a native species that grows 2–3 m tall. It is a reed-like perennial with rhizomes. The large, feathery flowerhead is purplish early in the season and matures to a straw colour.
Leaves and Stem: Stout stems are hollow and smooth. The open sheaths do not have an auricle, are smooth, and twist in the wind so that the leaves are to one side of the stem. The ligules are 1.5–3 mm long and consist of half membrane and half hairs. The flat, coarse leaves are 1–4 cm wide.
Flowerhead and Flowers: The flowerhead is 15–35 cm long and purplish, and has a feathery form. Spikelets are three- to six-flowered. The second glume is 1/2 the length of the first one. The first lemma is unawned; the upper lemmas are smaller and have awns that are nearly as long as the lemma body. The long, silky hairs on the flowerhead arise from the base of the lemma along the branch axis. These hairs are slightly longer than the lemma.
Habitat: Common Reed grows in marshes, ponds, lakeshores, and ditches in lowland to montane zones. In the Columbia Basin region, it occurs at Tie Lake, Premier Lake, Fairmont Hot Springs, St. Eugene Mission, and Brisco.
Similar Species: The tall stature and large, feathery flowerhead make Common Reed distinctive from all other species. However, in a vegetative state Common Reed may be confused with the other tall wetland grasses such as Reed Canary Grass. The ligule of Reed Canary Grass is pointed, long, and all membrane-like, whereas that of Common Reed has hair along the upper edge and is blunt rather than pointed. The leaf blades of Common Reed are very coarse, and both grasses have rhizomes.

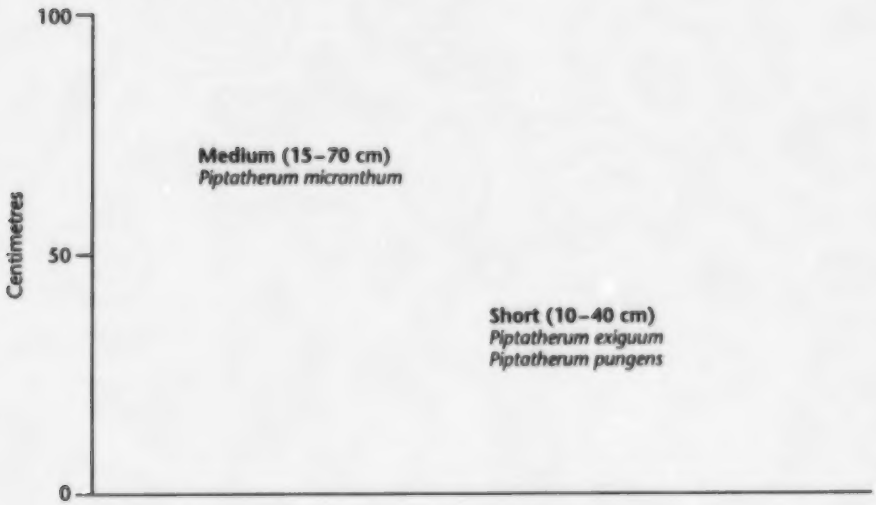


Piptatherum is a genus of 30 species, most of which are Eurasian. The name comes from the Greek word *pipto*, meaning fall, and *ather*, meaning awn. Originally, most of the members in this treatment were included in *Oryzopsis*, but Barkworth (1998) has separated them. *Piptatherum* has a blunt to sharp callus that is less that 1/5 the length of the flower. This separates the members from *Stipa*. Leaf blades of *Piptatherum* are more than 0.5 mm wide, the awns are weakly to strongly bent, and the callus is round rather than pointed. There are three species of *Piptatherum* in the Columbia Basin region.

***Piptatherum*—Adapted from Barkworth (1999)**

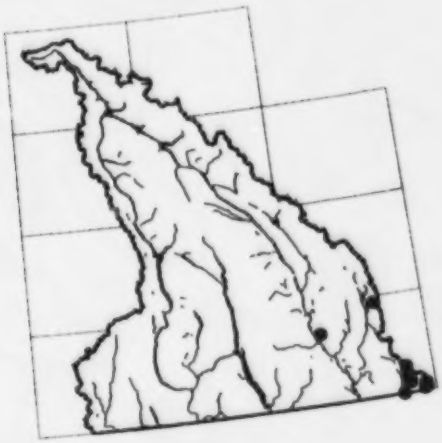
1a. Awns 1–2 mm long and absent at maturity..... *Piptatherum pungens*
1b. Awns 3–15 mm long and remain attached at maturity 2
  2a. Flowerhead branches spread; awns straight but twisted. . .
  ..... *Piptatherum micranthum*
  2b. Flowerhead branches pressed close to the flowerhead axis; awns strongly bent..... *Piptatherum exiguum*

Heights of *Piptatherum* species



Piptatherum exiguum (Thurber) Barkworth
Oryzopsis exigua Thurb.
Little Ricegrass

Plant: *Piptatherum exiguum* is a native species that grows 10–30 cm tall. It is a strongly tufted perennial with a spike-like flowerhead, and short, twisted awns.
Leaves and Stem: The smooth to slightly rough sheath is open and there are no auricles. The ligule is 3–4 mm high and pointed. The inrolled leaves are less than 1 mm wide.
Flowerhead and Flowers: The narrow flowerhead is 3–6 cm long and has short upward-pointing branches that are pressed tight to the stem. The glumes are broad and vary from blunt to somewhat pointed. They are equal in length. The hardened lemma is equal to or longer than the glumes. The lemmas have short hairs scattered over the back. The awn is 4–6 mm long and slightly twisted.
Habitat: Little Ricegrass grows in the steppe to the montane zone on dry talus slopes and ridges such as Mount Festubert, Grizzly Gulch, and Horseshoe Ridge.
Similar Species: Little Ricegrass resembles Small-flowered Ricegrass (*Piptatherum micranthum*). However, Little Ricegrass differs by having twisted awns, and flowerhead branches that are pressed close to the stem, whereas Small-flowered Ricegrass has branches that spread out from the stem axis.



Piptatherum micranthum (Trin. & Rupr.) Barkworth
Oryzopsis micrantha (Trin. & Rupr.) Thurb.
Small-flowered Ricegrass

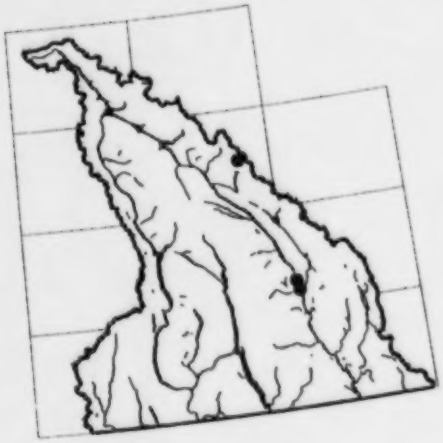
Plant: *Piptatherum micranthum* is a native species that grows 30–70 cm tall. It is a strongly tufted perennial with a moderately open, spike-like flowerhead.

Leaves and Stem: The open sheath is smooth to slightly hairy with fine, short hairs. The ligule is 0.5 mm long, blunt, and finely hairy along the edge. The flat or slightly inrolled leaf blades are 1–2 mm wide.

Flowerhead and Flowers: The flowerhead is 7–15 cm tall and appears spike-like, but has branches that are slightly diverging. The equal glumes are papery, transparent, and sharply pointed. The lemma is hairless or occasionally covered in fine hairs. The lemma awn is 6–8 mm long, straight, stiff, and longer than the flower.

Habitat: Small-flowered Ricegrass grows on dry, rocky slopes or open forests in the steppe or montane zone. In the Columbia Basin region it occurs at Yoho National Park, Canal Flats, and Armstrong Bay.

Similar Species: Small-flowered Ricegrass resembles Short-awned Ricegrass (*Piptatherum pungens*), but differs by having a spreading flowerhead, and branches and awns that remain after maturity. The awns of Short-awned Ricegrass fall off shortly after maturity.



Piptatherum pungens (Torrey) Barkworth
Oryzopsis pungens (Torr.) A.S. Hitchc.
Short-awned Ricegrass

Plant: *Piptatherum pungens* is a native species that grows 15–40 cm tall. It is a tufted perennial with a spike-like flowerhead.
Leaves and Stem: The open sheath is smooth anad there are no auricles. The ligule stands 0.5–1 mm high. Basal leaves are 10–30 mm wide, flat, or slightly inrolled.
Flowerhead and Flowers: The flowerhead is 2–6 cm long and spike-like and consists of branches that are tightly pressed against the spike axis. Hairless glumes are blunt or rounded and have a transparent edge. The lemma is as long as the glumes and covered in fine hairs. The awn is 1–2 mm long and falls off at maturity, so the flowers appear awnless.
Habitat: Short-awned Ricegrass grows on moist slopes in the montane zone in Yoho National Park.
Similar Species: Short-awned Ricegrass is unique in that it is the only species of *Piptatherum* in which the awn falls off at maturity.

Poa comes from the Greek word for grass, so it has been in common use for a long time. *Poa* has given its name to the grass family, the Poaceae. Kentucky Bluegrass is probably the name recognized by most people in conjunction with *Poa* species because it occurs in almost every lawn and pasture mixture. The bluegrass group of grasses are important as lawn, pasture, and forage grasses in North America. They have gone out of favour as pasture grasses because of their low midseason productivity. There is some debate as to where the name bluegrass came from, but one source stated that it was from Canada Bluegrass (*Poa compressa*), which is blue-green and was mistakenly used to describe Kentucky Bluegrass. Others attribute the common name to the blue appearance of a field of bluegrass at maturity. Others feel that the common name arose because it was the blueblood, or royalty, of the grasses.

As well as being the most common genus, it is also one of the most difficult to identify because several species reproduce asexually; that is, without the fusion of male and female gametes. In a few of the species of this genus, only female flowers form and reproduction occurs without pollen. Species resemble one another closely and many of the *Poa* species are of hybrid origin.

There are several key features that help separate *Poa* species from one another. These include the growth habit (i.e., whether it is an annual grass or is perennial), the presence of cobwebby hairs along the base of the lemma on the callus, and whether or not the lemma is keeled. The presence of a rhizome is also a key feature. Exact *Poa* identification sometimes demands a great deal of careful study, because a key feature is the degree of hairiness on the lemma, which requires the use of a dissecting microscope.

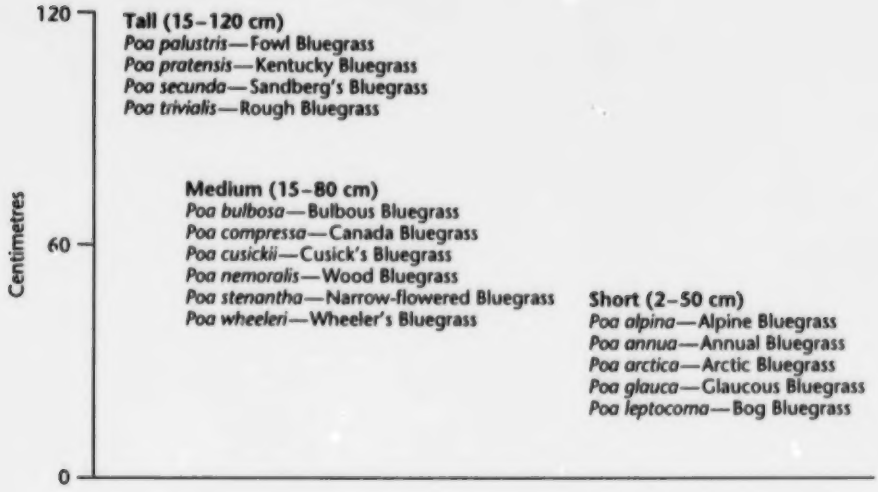
Kentucky Bluegrass was introduced to the east coast of North America by colonial settlers in 1600, and slowly spread west with settlement. Two species of *Poa* are the only vascular plant weeds in Antarctica. Many ecologists attribute the practice of seeding pastures with improved species with the decline in native grass species.

It would be a mistake to think that *Poa* species are introduced pasture grasses only. In western North America at high altitudes *Poa alpina*, *P. arctica*, *P. cusickii*, and *P. glauca* ssp. *rupicola* are important natural forage. Below the treeline *P. secunda (P.sandbergii)* and *P. glauca* are very important as natural forage.

***Poa*—Adapted from Hickman (1993)**

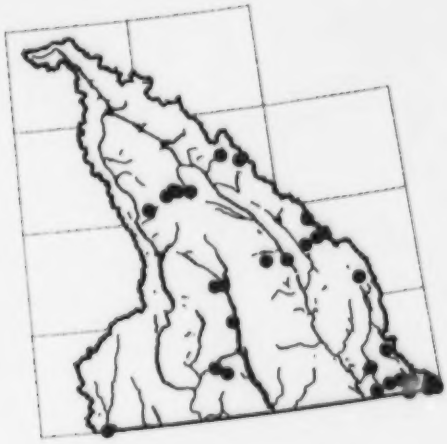
1a. Spikelets producing leafy bulblets in place of normal flowers 2
2a. Plants tufted with bulbous stem bases; leaves soft and soon withering . . . . . *Poa bulbosa*
2b. Plants with rhizomes; broader leaf blades . . . . . *Poa pratensis*
1b. Spikelets not producing bulblets 3
3a. Plants annual. . . . . *Poa annua*
3b. Plants perennial 4
4a. Rhizomes or stolons present 5
5a. Stem and nodes compressed; appear flattened; leaf sheaths open to near the base . . . . . *Poa compressa*
5b. Stem and nodes not compressed 6
6a. Callus cobwebby or not, or with a short tuft of hairs; but lemma has hairs throughout 7
7a. Flowers contain only female or pistillate flowers . . . . . *Poa wheeleri*
7b. Flowers have both anthers and stigma. . . . . *Poa arctica*
6b. Callus cobwebby; hairs may be short; lemma keel and veins only with hairs 8
8a. Lower glume three-veined . . . . . *Poa palustris*
8b. Lower glume one-veined. . . . . *Poa leptocoma*
4b. Rhizomes or stolons absent. 9
9a. Callus cobwebby 10
10a. Lower glume generally three-veined; sheaths open for 4/5 length. 11
11a. Ligule of upper stem leaf blunt . . . . . *Poa nemoralis*
11b. Ligule of upper stem leaf sharply pointed. . . . . *Poa palustris*
10b. Lower glume one-veined; sheaths open for less than 3/4 length 12
12a. Anthers shorter than 1 mm; high montane to alpine. . . . . *Poa leptocoma*
12b. Anthers longer than 1.3 mm; plants of lowland. . . . . *Poa trivialis*
9b. Callus not cobwebby but may have ring of short hairs. 13
13a. Spikelets broadly rounded at the base; flowerhead pyramid-like . . . . . *Poa alpina*
13b. Spikelets lance-shaped or cylinder-shaped in outline. 14
14a. Spikelet not compressed; lemma with weak keel. . . . . *Poa secunda*
14b. Spikelet compressed; oval in outline; lemma keeled to base 15
15a. Leaves soft and slightly inrolled to flat 16
16a. Ligule short and blunt on upper stem leaves. . . . . *Poa glauca*
16b. Ligule sharply pointed on upper stem leaves. . . . . *Poa stenantha*
15b. Leaves stiff, inrolled, and sometimes folded. . . . . *Poa cusickii*

Height of *Poa* species



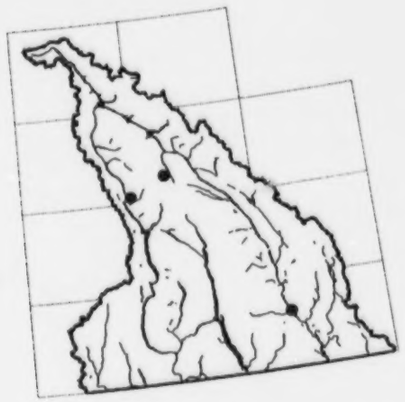
***Poa alpina* L.**
Alpine Bluegrass

Plant: *Poa alpina* is a native species that grows 10–40 cm tall. It is a densely tufted perennial grass with basal leaves and a leaf about half-way along the stem, bearing a pyramid-shaped flowerhead.
Leaves and Stem: The smooth sheaths are open, almost to the base, and persist as obvious white or cream-coloured sheath fragments at the base of the culms. There are no auricles. Blunt ligules are 1–3 mm long and ragged along the edge. Flat leaf blades are 2–4 mm wide and occur mostly at the base of the stem, where they form a dense mat. There are small leaves along the stem mostly below the midpoint of the stem. The tips of the leaves are boatlike or prow-like.
Flowerhead and Flowers: The pyramid-shaped flowerhead is as wide as it is long (2–6 cm). Spikelets are green to purplish. Two broad, unequal glumes have a wide transparent margin and minute bumps along the midnerve. The lemmas are almost as long as the glumes and have coarse hairs along the keel and the edges, but they do not have cobwebby hairs at the base.
Habitat: Alpine Bluegrass commonly occurs throughout the Columbia Basin region in alpine and subalpine communities in open meadows or gravelly disturbed sites.
Similar Species: Alpine Bluegrass resembles *Poa grayana*, and Douglas et al. (1994) have placed all records for *P. grayana* in with Alpine Bluegrass. Although Hitchcock et al. (1969) describe *P. grayana* as having cobwebby hairs, this feature varies greatly and is unreliable as a differentiating factor when separating Alpine Bluegrass and *P. grayana*.



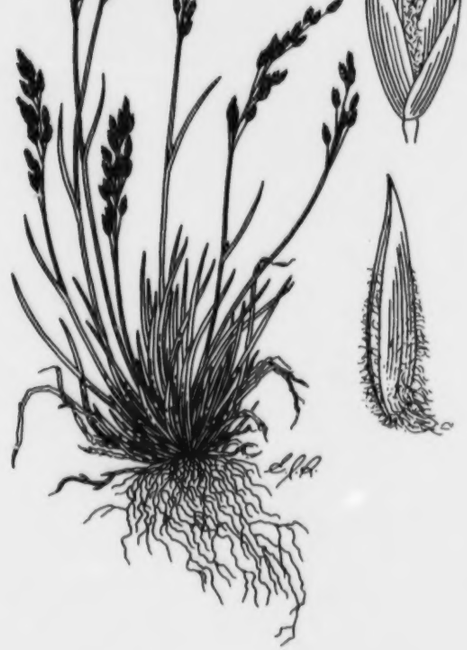
***Poa annua* L.**
Annual Bluegrass

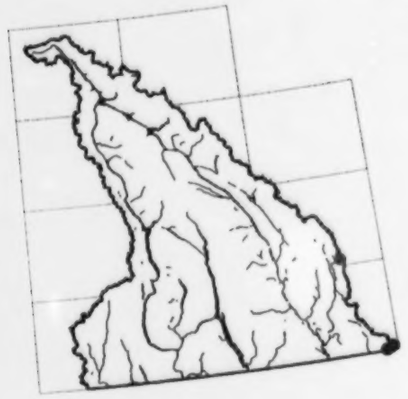
Plant: *Poa annua* is an introduced species that grows 5–25 cm long. It is an early flowering, hairless annual that forms small mats with whitish green, open flowerheads.
Leaves and Stem: Spreading and flattened stems root at the nodes from which the flowering branches arch upwards. Sheaths are open for more than 1/2 the length, but the margins overlap. Hairless leaf blades are 1–4.5 mm wide and folded in half along the midrib—especially the leaves toward the base. There are no auricles. The whitish ligule is about 1–2 mm high and clearly visible when you bend back the leaf blade.
Flowerhead and Flowers: The pyramid-shaped open flowerhead is 3–8 cm long. Branches are mostly perpendicular to the stem axis. The spikelets are 3–6 mm long and contain three to six flowers each. The two glumes are unequal and much shorter than the spikelet. The flowers are spaced out along the axis so much that you can see the axis between them. The five-nerved lemmas and the glumes may have purplish margins (especially in young flowers) and may be hairy toward the base.
Habitat: Annual Bluegrass is a common, weedy species that grows in gardens and lawns, along roadsides, on disturbed sites, and even in open woods. The collections of these specimens at the Royal BC Museum come from Fort Steele, Glacier National Park, and Mount Revelstoke Park.
Similar Species: The early flowering of Annual Bluegrass (starting in March), its small size, stem-rooting habit, and open flowerhead should be enough to distinguish this species from other very short grasses such as the hairgrasses (*Aira* spp.).



***Poa arctica* R. Br.**
Arctic Bluegrass

Plant: *Poa arctica* is a native species that grows 15–40 cm tall. It is a loosely tufted perennial with an open, pyramid-shaped flowerhead, and the branches are somewhat diverging from the axis.
Leaves and Stem: The stem curves upwards, growing from short rhizomes that could be confused with stolons. Sheaths are open to 1/4 of the length. The brown, dead leaves and sheaths persist around the base of the stem. These are not as creamy white as those of Alpine Bluegrass. The leaves are short and usually inrolled with rough edges. The pointed ligule is 1–3 mm high. There are no auricles.
Flowerhead and Flowers: The flowerhead is open and pyramid-shaped. Purplish spikelets contain two to three flowers. The glumes are equal in length and the lemmas are more or less hairy at the base and across the lower back. There is often a tuft of cobwebby hairs at the base of the lemma on the callus.
Habitat: In the Columbia Basin region, Arctic Bluegrass has been collected from the Flathead area and likely grows widespread throughout the region in moist to wet meadows in the alpine and subalpine zone.
Similar Species: Arctic Bluegrass has two subspecies in British Columbia: *lanata* and *arctica*. Subspecies *lanata* has longer spikelets (>6 mm) and correspondingly longer lemmas than subspecies *arctica*. The stem leaf blades are flat and more than 2 mm wide. Subspecies *arctica* has smaller spikelets and the stem leaf blades are folded or inrolled and less than 2 mm wide. Douglas et al. (1994) note that subspecies *arctica* is widespread throughout British Columbia, whereas subspecies *lanata* occurs in northwest British Columbia.

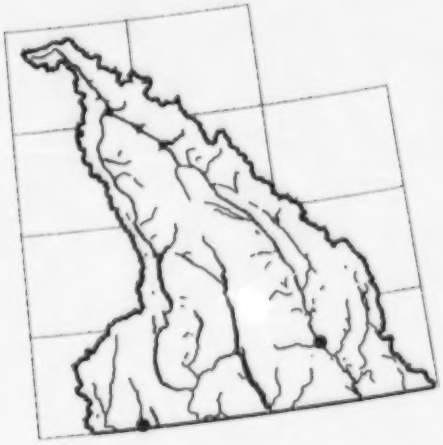




***Poa bulbosa* L.**
Bulbous Bluegrass

Plant: *Poa bulbosa* is an introduced species that grows 15–50 cm tall. It is a tuft-forming perennial that grows leafy bulblets in place of some flowers. The flowerhead looks purplish and is leafy.
Leaves and Stem: Stem bases sometimes develop a narrow, bulb-like form surrounded by old, dry leaf sheaths. Sheaths are open nearly to the base. The soft leaf blades are 1 mm wide and flat to folded, and wither away. Leaf tips are not really prow-like. Ligules are 1.5–3.0 mm long and have a smooth to slightly jagged margin with the highest point in the middle. You can see the ligules easily with the naked eye. There are no auricles.

Flowerhead and Flowers: The leafy flowerhead is 10 cm long, and may have an open or narrowed form that has branches with several spikelets. The spikelets are 3.5 mm long and crowded with purplish, bulbous mini-plants, which may be up to 2 cm long. The purple base of the mini-plant extends into green, hair-like leaves. The glumes are 2–3 mm long, nearly equal, and much shorter than the flowers. Normal non-bulbil lemmas (when you can find them) are small and prominently keeled and have a cobwebby base.
Habitat: Bulbous Bluegrass grows in disturbed sites. It can become very weedy in dry, disturbed sites such as roadsides and paths, and is widespread throughout the Columbia Basin region.
Similar Species: Leafy flowerheads combined with bulbous leaf bases distinguish Bulbous Bluegrass from other bluegrasses, especially the somewhat similar Fowl Bluegrass (*Poa palustris*).



***Poa compressa* L.**
Canada Bluegrass

Plant: *Poa compressa* is an introduced species that grows 20–60 cm tall. It is a bluish green perennial with flattened stems, slender rhizomes, and narrowed flowerheads.

Leaves and Stem: Plants grow from a strong rhizome system and may sometimes produce stolons. The stems are strongly flattened with two edges. Sheaths are open nearly to the base. The flat to folded leaf blades are 2–4 mm wide and have a prow-like tip that is sharply pointed. Leaf blade edges are slightly rough. Slightly hairy ligules are 0.5–1.5 mm long and have a smooth margin. There are no auricles.

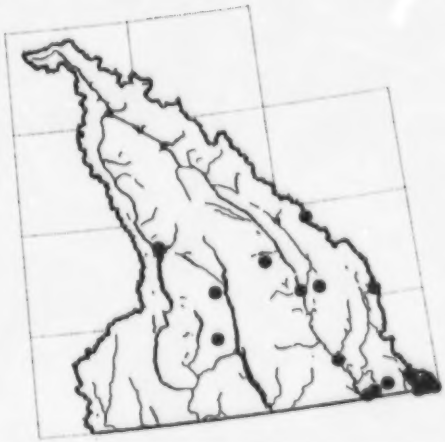
Flowerhead and Flowers: The flowerhead is compact, narrowed, and 3–12 cm long. Spikelets have mostly three to six flowers held inside two, nearly equal glumes. The glumes are about 1/2 as long as the spikelet. Flowers contain both male and female parts, and have strongly keeled lemmas, which may have webbing at the base.

Habitat: Canada Bluegrass is a weedy species of relatively moist disturbed sites, roadsides, and gardens that occasionally spreads into meadows and open woods. In the Columbia Basin region it also occurs in dry sites. It is sometimes used in pasture mixes.

Similar Species: Canada Bluegrass resembles other bluegrasses, but in British Columbia it is distinguished at first sight by the flattened stems.

Poa cusickii **Vasey**
Cusick's Bluegrass

Plant: *Poa cusickii* is a native species that grows 20–60 cm tall. It is a densely tufted perennial with no rhizomes, but very fibrous roots and a narrow, closed, compact flowerhead.
Leaves and Stem: The leaf sheaths are closed to almost 1/2 their length and the dead sheaths persist at the base of the living leaf sheaths. The leaves are 0.5–1 mm wide and mostly basal and inrolled, and may feel rough. The ligules are 1–3 mm high and pointed, but the edge may be jagged so the point may be difficult to distinguish. There are no auricles.
Flowerhead and Flowers: The flowerhead is 2–9 cm long, narrow, and compact. It has an oblong shape, rather than the pyramidal shape of many *Poa* species. The slightly keeled glumes are unequal and shorter than the spikelet. The keeled lemmas have five prominent nerves with short, rough hairs on the keel. The back of the lower half of the lemma may sometimes be rough. There is no webbing at the base.
Habitat: Cusick's Bluegrass is widespread in low elevations and in alpine meadows. In the Columbia Basin region it has been found primarily at Akamina-Kishinena Creek, Kokanee Park, Paradise Mine, and Commerce Peak and throughout the Flathead region.
Similar Species: All plants of this species complex in the Columbia Basin region are female. Consequently, there are no anthers or else they are nonfunctional. Wheeler's Bluegrass (*Poa wheeleri*) is similar to Cusick's Bluegrass, but Cusick's Bluegrass has a more closed flowerhead, thinner ligules, and no rhizome. In British Columbia there are three subspecies of *Poa cusickii*: *pallida*, *epilis*, and *cusickii*. Within subspecies *epilis*, there has been one variety described: variety *purpurascens*. The table below is an outline of the major differentiating characters of Cusick's Blue- grass subspecies. For more detail, Soreng (1991) has provided a key to the subspecies in the *Epiles* group, which is a group within *Poa*.

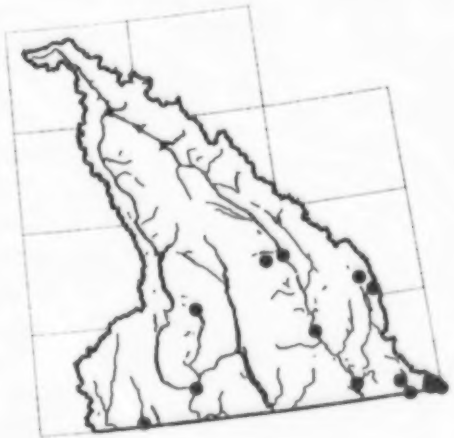


Subspecies	Basal tuft of leaves	Stem nodes exposed	Lower panicle branch	Habitat	Flowerhead
ssp. *cusickii*	dense	0–1	> 17 mm long	moist or dry	
ssp. *pallida*	dense	0–1	< 17 mm long	dry alpine ridges	
ssp. *epiles*	sparse	1–2			lemmas smooth, flowerhead compact, > 20 spikelets
ssp. *epiles* var. *purpurascens*	sparse	1–2			lemmas hairy at the base of the keel, flowerhead loosely contracted, < 20 spikelets

Poa glauca Vahl
Poa interior Rydb. pro parte
Glaucous Bluegrass

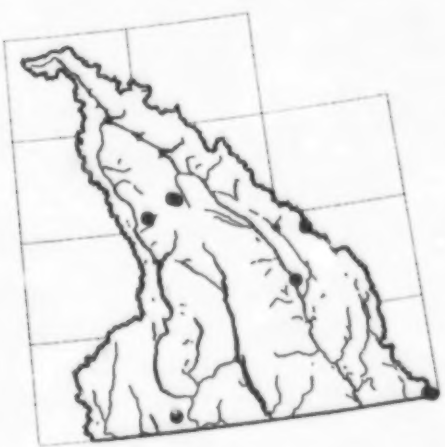
Plant: *Poa glauca* is a native species that grows 5–50 cm tall. It is a densely tufted, perennial with a narrow, lance-shaped, bluish grey flowerhead.
Leaves and Stem: The height varies between the two subspecies—one is a dwarf alpine form. The hairless sheaths are closed only at the base. Stems and leaves are hairless except that the stem has a rough patch just below the flowerhead. The ligules are 0.5–1.5 mm high and variable, and may be blunt to rounded with a slightly jagged margin. The leaf blades are short, stiff, 1–1.5 mm wide, and folded rather than inrolled. There are no auricles.
Flowerhead and Flowers: The narrowly lanceolate flowerhead has rough branches. Glumes are sharp and lance-shaped. Keeled lemmas are rough-textured. Sparsely spaced hairs occur along the keel and the edge nerves. There are no cobwebby hairs at the base of the lemma.
Habitat: Glaucous Bluegrass occurs commonly throughout the Columbia Basin region on dry, open slopes and gravelly meadows in the montane to alpine zones, such as those at Mount Festubert, Ashman Lake, and Observation Mountain.

Similar Species: Soreng (1994) includes *Poa interior* in the description of Glaucous Bluegrass and describes form *P. interior* Rydb. as having true green—rather than bluish green—leaves, short hairs on the lemma keel, and nerves at the edge of the lemma. Hitchcock et al. (1969) also describe Glaucous Bluegrass as having longer ligules than *P. interior*. Glaucous Bluegrass has two subspecies in British Columbia. *P. glauca* ssp. *rupicola*, which is the dwarf alpine form, has densely short hairs between the keel and the nerves at the edge of the lemma. There are no cobwebby hairs on the callus. The other subspecies, *P. glauca* ssp. *glauca*, has lemmas that are covered in short hairs throughout.



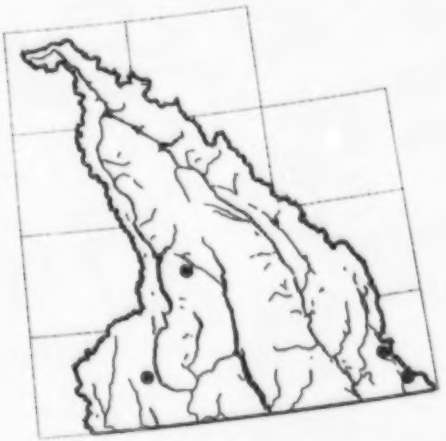
Poa leptocoma Trin.
Bog Bluegrass

Plant: *Poa leptocoma* is a native species that grows 15–30 cm tall. It is a densely tufted grass with a slender stem and an open, drooping flowerhead.
Leaves and Stem: The smooth stems often recline or lie on the ground and occasionally have stolons. Smooth or slightly rough leaf sheaths are closed to almost 1/2 their length. The flat and lax leaves have a prow-like tip and are 1–4 mm wide. The ligule is 1.5–2 mm high and blunt. There are no auricles.
Flowerhead and Flowers: The open flowerhead has paired branches and a droopy appearance, because long, thin branchlets carry the spikelets. The flowerheads are often purplish. Glumes have sharp points, and both glumes are keeled and slightly rough along the keel. The lower glume has one vein. The lemmas have a strong keel and a broad, transparent margin. The keel and lemma edges are covered with dense, long silky hairs. *Lepto* is Greek for "fine," and *coma* is Latin for "hair" in reference to these hairs. The lemmas are cobwebby at the base. Elsewhere, except on the keel and the marginal nerves, the lemmas are hairless.
Habitat: Bog Bluegrass has been collected from moist meadows in the alpine and subalpine zones in Glacier National Park, Fairmont Hot Springs, and Old Glory Mountain.
Similar Species: Cody (1996) placed Bog Bluegrass and Western Bluegrass together as Bog Bluegrass. Douglas et al. (1994) distinguished these two species in their key. Bog Bluegrass has a longer flowerhead than Western Bluegrass (4–15 cm compared to less than 7 cm) and rough branchelets. The first glume of Bog Bluegrass has one nerve rather than one to three nerves as in the Western Bluegrass. The glumes of Bog Bluegrass are awl-shaped rather than broadly lance-shaped. For the purpose of this work we have combined Bog Bluegrass and Western Bluegrass.



Poa nemoralis L.
Poa interior Rydb.
Wood Bluegrass

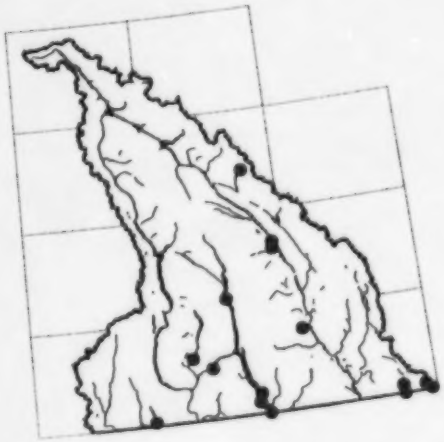
Plant: *Poa nemoralis* is an introduced species that grows 30–70 cm tall. It is a tufted perennial with a stem that appears to scramble along the ground before becoming upright with an erect, drooping, narrow flowerhead.
Leaves and Stem: Stolons may be present. The sheaths are closed for less than a 1/4 of the length, and there are no auricles. The blunt and very short ligules are 0.3–0.6 mm long. The flat or inrolled leaf blades are 1.5–3 mm wide.
Flowerhead and Flowers: The erect to drooping flowerhead is narrow and 8–20 cm long. The spikelets are strongly flattened. The unequal glumes are sharp-pointed and shorter than the spikelet. The lower glume has three veins. The lemmas are hairy on the keel and about 3 mm long. The lemma has a cobwebby base, but you may have to look at several spikelets to see this character.
Habitat: Wood Bluegrass grows in moist forests and on streambanks. It occurs commonly along the Kootenay River near Castlegar and along the Elk River, as well as other sites. The word *nemoralis* is Latin for a grove or woodland.
Similar Species: *Poa nemoralis* and *P. interior* are considered by several authors to be the same species. Douglas et al. (1994, p. 136) describe the similarities under the *P. glauca* description and suggest that "this species (*Poa nemoralis*) should include *P. glauca* since nearly continuous variation occurs between them with *P. interior*." Hitchcock et al. (1969) describe *P. interior* as a separate species from *P. nemoralis* and differentiate the two based on smaller spikelets in *P. interior* and glumes that are shorter and less pointed than those of *P. nemoralis*. Hitchcock et al. (1994) go on to say that *P. interior*, as well as *P. rupicola*, could be treated as races of *P. glauca*. In this treatment we have included *P. interior* as part of *P. nemoralis*, but we have treated *P. glauca* as a separate species.



***Poa palustris* L.**
Fowl Bluegrass

Plant: *Poa palustris* is an introduced species that grows 40–120 cm tall. It is a fibrous-rooted, tufted perennial with curved purplish lower stems and an open-branched flowerhead.
Leaves and Stem: The lower parts of stems lie upon the ground and root at the nodes like stolons. Stem bases are purplish. The sheaths are open and overlapping to the node below. The leaf blades are flat to folded, up to 20 cm long, 1.5–3 mm wide, and droopy, and end in prow-shaped tips. Ligules are 2–5 mm high and the margin is wavy or jagged. There are no auricles.
Flowerhead and Flowers: The flowerhead is 10–30 cm long, and open and loose, with whorls of four to six branches at the widely separated lower nodes. Spikelets contain two to four flowers. The nearly equal, narrow glumes reach half-way up the spikelet. The strongly keeled lemmas have masses of webbed hairs at the base and up the keel.
Habitat: Fowl Bluegrass occurs in moist forests and forest openings and often grows at the edge of water such as streams, wetlands, sloughs, and ditches. Fowl Bluegrass occurs at Radium, Nelson, Natal, Field, Creston, Flathead Valley, and Forum Lake. The word *palustris* comes from the Latin and means marsh or swamp.

Similar Species: Fowl Bluegrass is similar to Bulbous Bluegrass, but Fowl Bluegrass is distinguished by its large, open flowerhead and lack of purplish plantlets in the spikelets.



***Poa pratensis* L.**
Kentucky Bluegrass

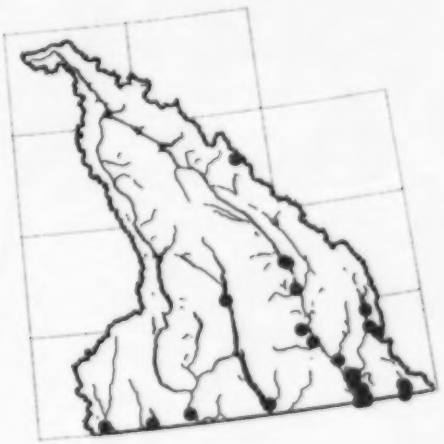
Plant: *Poa pratensis* is both native and introduced. It grows 30–100 cm tall. It is a perennial with long, creeping rhizomes that form a dense sod. The flowerhead ranges from somewhat condensed to open, and often droops or sweeps to one side.

Leaves and Stem: The leaves are thin and up to 30 cm long, have inrolled margins, and typically form a mass at the base of the smooth stems. Sheaths are closed for about 1/2 their length. The leaf blades of the stem are mostly 2–4 mm wide and flat to folded, and end in the distinctive prow-shaped tip. Ligules are 1–3 mm long with entire to slightly irregular to rough margins. There are no auricles.

Flowerhead and Flowers: The narrowed but moderately loose flowerhead ranges from 3 to 15 cm long and has three to five branches per node (lower ones). The form is weakly pyramid-like, but the branches may droop or sweep to one side, especially with age. The strongly flattened spikelets are three- to five-flowered. One glume is slightly smaller, and both have well-developed keels. Flowers extend beyond the glumes. Lemmas are strongly keeled and cobwebby at the base.

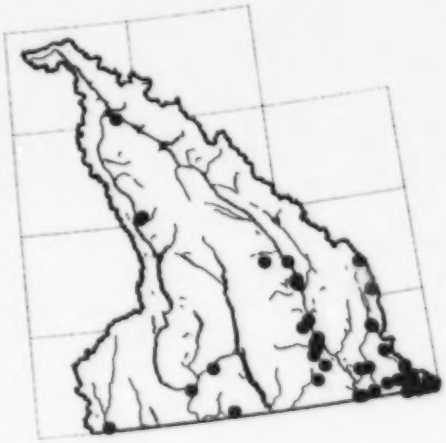
Habitat: Kentucky Bluegrass occurs on roadsides, disturbed or waste sites, dry to moist meadows, uncut lawns, pastures, and woodland clearings. Expect this species in settled areas throughout the Columbia Basin region. The word *pratensis* comes from the Latin word *pratens*, which means "found in meadows."

Similar Species: This species has several subspecies in British Columbia. Some of these are introduced from Europe (subspecies *pratensis*, subspecies *irrigata*, and subspecies *angustifolia*) and there are three native subspecies (subspecies *agassizensis*, subspecies *alpigena*, and subspecies *colpodea*). For greater detail and a key of these subspecies consult Douglas et al. (1994).



Poa secunda J.S. Presl.
P. ampla Merr., ***P. juncifolia*** Scribn., and ***P. nevadensis*** Vasey = ***Poa secunda*** ssp. ***juncifolia***
P. canbyi (Scribn.) Howell, ***P. gracillema*** Vasey, ***P. incurva*** Scribn., ***P. sandbergii*** Vasey, and ***P. scabrella*** (Thurb.) Benth. = ***Poa secunda*** ssp. ***secunda***
Sandberg's Bluegrass

Plant: *Poa secunda* is a native species that grows 30–45 cm tall. It is a strongly tufted, purplish perennial with relatively narrow heads on mostly leafless stems.
Leaves and Stem: Mostly leafless purplish stems arise from a mass of basal leaves. Sheaths are closed for about 1/6 of their length. Very narrow leaf blades are inrolled or folded, almost never flat, 0.5–1.5 cm wide, and 2–3+ cm long. Ligules of stem leaves are 1.5–3 mm long. There are no auricles.
Flowerhead and Flowers: The flowerhead is 3–10 cm long and narrowed to somewhat open, and has erect to ascending branches. The purplish spikelets are three- to five-flowered and 0.5–0.8 cm long. Slightly unequal glumes are 1/2 to 1/3 the length of the spikelet. Lemmas are about 4 mm long and convex or rounded on the back, and there are no cobwebby hairs at the base. The lemmas are not prominently keeled like other bluegrasses.
Habitat: Sandberg's Bluegrass occupies dry meadows, ridges, and rocky knolls. In the Columbia Basin region this apomictic complex (reproduces asexually), ranges widely from the Flathead to Windermere Lake. Douglas et al. (1994) describe subspecies *juncifolia* as common in saline and alkaline meadows to rich meadows in the steppe and montane zone whereas subspecies *secunda* is common in well-drained grasslands in the steppe and montane zone.
Similar Species: This "species" includes a complex of different types that need a systematic study. Generally, members of this group are distinguished from other *Poa* species by their bunchgrass habit, narrow, dense flowerheads, non-flattened spikelets, and lemmas without cobwebby hairs at the base. Soreng (1991) has grouped together a number of taxa in this species (*P. ampla*, *P. canbyi*, *P. gracillema*, *P. incurva*, *P. juncifolia*, *P. nevadensis*, *P. sandbergii*, and *P. scabrella*). *P. juncifolia*, *P. sandbergii*, and *P. scabrella* were well recognized as individual species before Soreng's treatment.



Subspecies	Lemmas	Palea nerves	Ligules
ssp. *juncifolia*	smooth or rough	rough	<2 mm; blunt
ssp. *secunda*	hairy with long hairs	long hairs on nerves	>2 mm; sharp

Poa stenantha Trin.
Narrow-flowered Bluegrass

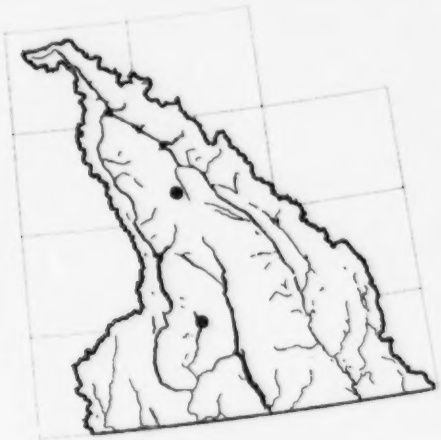
Plant: *Poa stenantha* is a native species that grows 25–60 cm tall. It is a tufted perennial with basal leaves and an open flowerhead that spreads or droops. The word *stenantha* comes from the Latin for narrow flower.

Leaves and Stem: The smooth sheaths are closed at the base for about 1–2 cm. The 1- to 3-mm-high ligules are sharply pointed and have rough hairs. Leaf blades are 1–2 mm wide, inrolled to flat, and lax not stiff. There are no auricles.

Flowerhead and Flowers: The open, drooping flowerhead reaches 7–15 cm long. There are two to three branches per node at the base of the flowerhead. The three-nerved glumes are unequal in length and extend about 1/2 the length of the spikelet. Strongly keeled lemmas have long hairs at the base and along the edge of the lower portion but they do not have a cobwebby callus below the base of the lemma.

Habitat: Narrow-flowered Bluegrass grows in wet meadows and forest openings in the montane to subalpine zones. In the Columbia Basin region it grows in Glacier National Park and near New Denver.

Similar Species: Narrow-flowered Bluegrass resembles Bog Bluegrass. It is easy to mistake the two. Look carefully at the base of the lemma because Narrow-flowered Bluegrass does not have a cobwebby base, whereas Bog Bluegrass does.

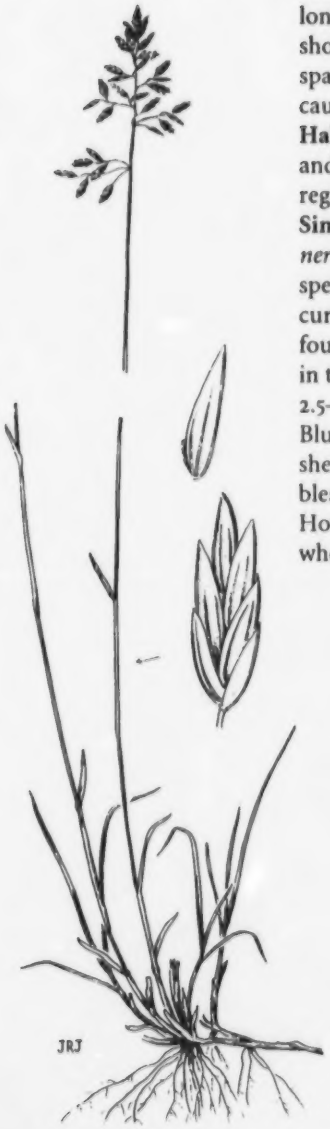


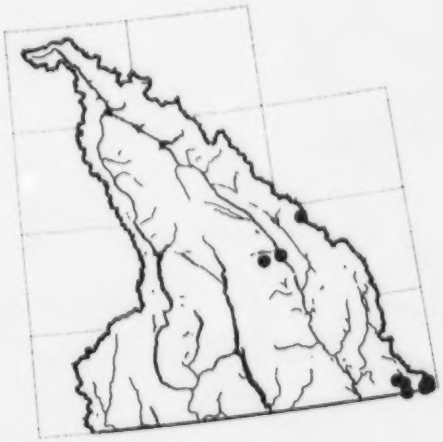
***Poa trivialis* L.**
Rough Bluegrass

Plant: *Poa trivialis* is an introduced species that grows 40–100 cm tall. It is a stolon-bearing plant with drooping leaves and an open, pyramid-shaped flowerhead.
Leaves and Stem: The slightly roughened sheaths are open and may appear to overlap. The drooping, flat leaf blades are 15–20 cm long by 2–4 mm wide. Tips are only slightly prow-like. The prominent, pointed ligules are 3–7 mm high. There are no auricles.
Flowerhead and Flowers: The open flowerhead is 8–15 cm long, with as many as five branches at the lower nodes. Spikelets have two to three flowers. The two nearly equal, sharply pointed glumes reach slightly more than 1/2 the height of the spikelet. Lemmas are smooth except for the short scattered hairs along the keel. There are long, tangled, cobwebby hairs at the base.
Habitat: The typical environment for Rough Bluegrass includes moist disturbed woods and wet sites. It occurs in the Columbia Basin region at Mount Morrissey.
Similar Species: Rough Bluegrass may at first appear to have a rhizome, but on closer examination it is obvious that the rhizome is a stolon that roots at the nodes. Rough Bluegrass may also look like Fowl Bluegrass, but the nerves on the longer lemmas are more pronounced in Rough Bluegrass. The ligules are longer (3–7 mm long for Rough Bluegrass vs 2–5 mm long for Fowl Bluegrass).

Poa wheeleri Vasey
Poa nervosa var. ***wheeleri*** (Vasey) C.L. Hitchc.
Wheeler's Bluegrass

Plant: *Poa wheeleri* is a native species that grows 35–80 cm tall. It is a loosely tufted perennial that grows from short rhizomes and has an open to contracted flowerhead with slender branches.
Leaves and Stem: The leaf sheaths are open 1/3 to 2/3 their length. The lower end of the sheaths have dense, short hairs that are curved backwards and the collar of the sheath is short-hairy to rough, but does not have long hairs. The blunt or rounded ligules are 0.5–2 mm high. The soft to firm leaf blade can be flat or folded, but generally the stem leaf blades are inrolled and have a finely hairy upper surface. There are no auricles.
Flowerhead and Flowers: The open to oval-shaped flowerhead is 5–12 cm long. Its spreading branches are sparse and thread-like. Pointed glumes are shorter than the first flowers. The blunt to rounded lemma is smooth to sparsely hairy or rough. There are only female flowers without anthers because this species reproduces apomictically (without sex).
Habitat: Wheeler's Bluegrass grows in moist meadows, scree seepage areas, and open forests in the montane to subalpine zones. In the Columbia Basin region it grows in the Flathead area.
Similar Species: Wheeler's bluegrass is very similar to Coastal Bluegrass (*Poa nervosa*). In fact, some people consider it a variety of *P. nervosa.* The two species are separated, in part, by geographic range. Wheeler's Bluegrass occurs east of the Coast-Cascade Mountains, whereas Coastal Bluegrass is found only west of the Coast-Cascade Mountains. There is also a difference in the length of the lemma (3–6.5 mm for Wheeler's Bluegrass compared to 2.5–3.5 mm for Coastal Bluegrass). The lower culm sheaths of Wheeler's Bluegrass are hairy with short backward-facing hairs, whereas the lower culm sheaths of Coastal Bluegrass are rarely hairy. Wheeler's Bluegrass also resembles Cusick's Bluegrass in that they both have only pistillate flowers. However, Wheeler's Bluegrass has a more open panicle and has a rhizome, whereas Cusick's Bluegrass has creeping stolons and no rhizome.

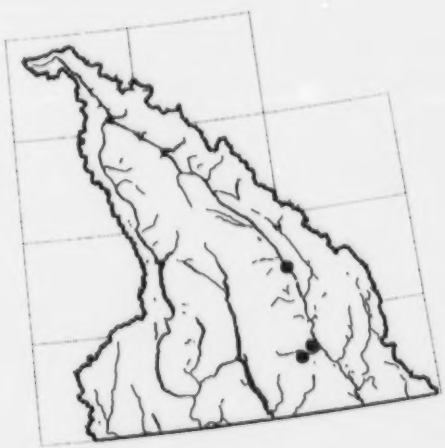




This small, Old World genus derives its name from the *poly* (= many) long glume awns, which give the flowerhead a *pogon* (= beard-like texture).

Polypogon monspeliensis (L.) Desf.
Rabbitfoot Polypogon

Plant: *Polypogon monspeliensis* is an introduced species that grows 20–70 cm tall. It is a tufted annual with a dense, "fuzzy," egg-shaped flowerhead.
Leaves and Stem: The stem is often bent along the ground and rooting when growing in standing water. Open sheaths are smooth to rough to the touch. There are no auricles. The ligules are 3–10 mm long and membrane-like, with short, rough hairs. The ligule shape varies from narrow with a short point to blunt with a ragged tip. The leaf blades are flat, 4–7 mm wide, and rough.
Flowerhead and Flowers: The dense, "fuzzy" flowerhead reaches 2–15 cm long. Spikelets are one-flowered and cluster in a dense, tight flowerhead. The roughened glumes are tawny with age and awned from between short, rounded lobes at the tip. The glume awn is 6–10 mm long. The lemma is about 1/2 as long as the glumes, smooth and shiny, and toothed at the rounded tip. The lemma awn is slender and exceeds the glumes by as much as 1.5 mm.
Habitat: Rabbitfoot Polypogon grows in wet to dry waste places and around the edges of vernal pools. In the Columbia Basin region Rabbitfoot Polypogon occurs at Windermere, Kimberley, and Marysville.
Similar Species: The plump, fuzzy head of the species is diagnostic, and should not be confused with any other species.

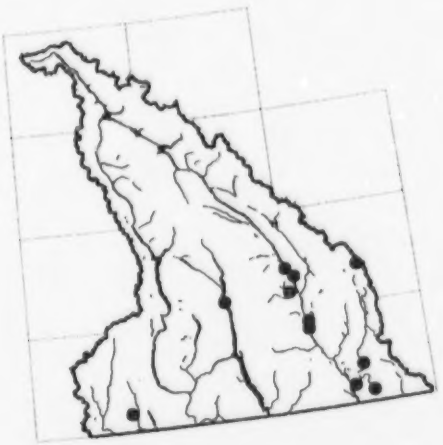


Pseudoroegneria is another genus to which species were transferred from *Agropyron*. This name change has affected the most common species in the Columbia Basin region—*Agropyron spicatum*, or "*Ag spic*," as it is called by range managers. (Somehow "*Pseudoroeg spic*" does not have the same ring!) The glumes of *Pseudoroegneria* can be more than 15 mm long, and are lance-like and veined the entire length. The lemma awns, when present, are more than 10 mm long .

Pseudoroegneria spicata (Pursh) A. Löve
Agropyron spicatum (Pursh) Scribner J. Smith
Bluebunch Wheatgrass

Plant: *Pseudoroegneria spicata* is a native species that grows to 1.5 m tall. It is a strongly bunched perennial with a spike-like flowerhead. The bunch can form a clump up to 1.5 m wide, but there are no rhizomes.
Leaves and Stem: The sheaths are smooth or covered in very short backward-pointing hairs. The ligules are barely 1 mm long and appear as a ring of hairs. The flat or somewhat inrolled leaf blades are 1.5–4.5 mm wide. They are smooth underneath but have some hairiness on the upper surface. The clasping auricles are well developed.
Flowerhead and Flowers: The flowerhead is a spike with an open but unbranched construction, 8–15 cm long. The five-to eight-flowered spikelets are spaced along the axis at a distance slightly longer than their length. The two lance-shaped, unequal glumes are shorter than the spikelet and can be smooth to covered in short hairs. The glume awns vary in length. Lemmas are smooth to slightly rough and may bear prominent or slightly bent awns.
Habitat: Bluebunch Wheatgrass grows on dry, open sites in the steppe and montane zones and is the most common species of the open grassland in British Columbia. It is considered one of the most important native forage bunchgrasses. In the Columbia Basin region it grows at Reco Mountain, along the Pend'Oreille River, in Cranbrook, Invermere, and Canal Flats, and at Fairmont Hot Springs (to name a few localities).

Similar Species: Bluebunch Wheatgrass specimens in the Royal BC Museum's collection are annotated as belonging to two subspecies: ssp. *spicata* and subspecies *inermis*. Douglas et al. (1994) do not describe these subspecies, but allude to the existence of awned and unawned types. M. Barkworth (pers. comm. 1999) feels that the subspecies are valid, and that subspecies *inermis* differs from subspecies *spicata* due to a lack of awns. She has observed that subspecies *inermis* occurs in the southern part of the range, and that subspecies *spicatum* occurs in the northern portion of the range. T.C. Brayshaw (pers. comm. 1999) has observed both subspecies in Kelowna.



Named after the Italian botanist Benedetto Puccinelli, this genus favours saline or alkaline habitats. *Puccinellia* species are somewhat palatable as forage, but tend to get easily trampled by livestock in muddy sites. The *Puccinellia* flowerhead resembles that of *Glyceria*, but *Puccinellia* has open, rather than closed, sheaths.

***Puccinellia*—Adapted from Cody (1996)**

1a. Glumes more or less keeled and sparsely hairy; lemmas pointed. . . . . *Puccinellia nuttalliana*

1b. Glumes not keeled; lemmas blunt . . . . . *Puccinellia distans*

Puccinellia distans (Jacq.) Parl.
Weeping Alkaligrass

Plant: *Puccinellia distans* is an introduced species that grows 10–40 cm tall. It is a tufted perennial with rough branches and an open, narrowly branched flowerhead.

Leaves and Stem: The smooth to rough sheaths are fully or partially open. There are no auricles. Membrane-like ligules are blunt and 1 mm long and have a smooth edge (not toothed). Flat to inrolled leaves are 1.5–3.5 mm wide.

Flowerhead and Flowers: The narrowly open flowerhead has spikelets with five to six flowers in each spikelet. The nearly equal glumes are oval, have tiny hairs over the surface as well as along the edge, and are shorter than the first flower. Broadly oval lemmas have a blunt, ragged tip and bear scattered hairs at the base.

Habitat: Weeping Alkaligrass grows in salt flats and along lakeshores in the lowland to montane zones. In the Columbia Basin region, Weeping Alkaligrass occurs at Kimberley and Hahas Lake.

Similar Species: Weeping Alkaligrass differs from other similar alkaligrasses, such as Nuttall's Alkaligrass (*Puccinellia distans*), by having lower branches that spread or point downward, 2.0-mm-long lemmas, and lemma tips that are always blunt.

Puccinellia nuttalliana (Schult.) A.S. Hitchc.
Nuttall's Alkaligrass

Plant: *Puccinellia nuttalliana* is a native species that grows 40–100 cm tall. It is a tufted perennial with a large, open, widely branched flowerhead.
Leaves and Stem: Sheaths are open to partially closed. Leaf blades are 1–3 mm wide and sometimes inrolled. There are no auricles. Ligules reach 1–3 mm high.
Flowerhead and Flowers: The flowerhead is 6–20 cm long, open, and widely branched, with about four branches at each node. Spikelets have four to seven flowers. The two, unequal glumes are much shorter than the spikelet and slightly keeled. The lemmas are 2.5–3.2 mm long, which is as long or longer than the largest glume. The lemma tip narrows abruptly to a small, irregular tip.
Habitat: This predominantly interior species grows in relatively moist alkaline meadows but also occurs in saline meadows along the coast. In the Columbia Basin region, Nuttall's Alkaligrass grows along the Kettle River and the Saint Mary's River.
Similar Species: The lower branches of the flowerhead of Nuttall's Alkaligrass are either slightly upward-pointing, perpendicular, or even drooping. This contrasts with European Alkaligrass, which has downward-pointing branches.

This is a genus of two species, with only one occurring in North America. The name is derived from the Greek words *schizo*, meaning split, in reference to the lemma tip, and *achne*, meaning chaff.

Schizachne purpurascens (Torr.) Swallen
False Melic

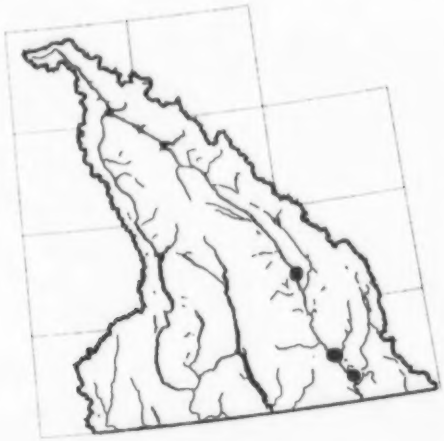
Plant: *Schizachne purpurascens* is a native species that grows 60–100 cm tall. It is a perennial with a reclining base, no rhizome, and a long, drooping, purplish flowerhead.

Leaves and Stem: The smooth, closed sheath has no auricles. The ligules are longest in the front and rarely over 1 mm long. The slightly roughened, flat leaf blades are 2–5 mm wide.
Flowerhead and Flowers: The drooping, scarcely branched flowerhead is 10 cm long and has purplish four- to five-flowered spikelets. The upper one or two flowers are reduced to sterile lemmas. Purplish, membrane-like glumes are shorter than the first lemma. The round-backed lemmas have teeth for 1/4 their length. The callus at the base of the lemma has hairs (3 mm long) that extend about 1/2 the length of the lemma. The slightly bent lemma awn is about equal to or slightly longer than the lemma.
Habitat: False Melic grows on moist to dry, open forests in the montane zone, occuring at Yoho National Park and Waldo (now under Lake Koocanusa).
Similar Species: False Melic resembles Nodding Trisetum (*Trisetum cernuum*), but False Melic lacks a sharp tip on the larger glume, and it has longer callus hairs.

Schizachyrium is a large genus well represented in the subtropical-tropical grasslands. Several members of this genus form an important component of the prairie grassland complex, in particular the tall-grass prairie. In British Columbia, only *Schizachyrium scoparium* occurs.

Schizachyrium scoparium (Michx.) Nash in Small
Andropogon scoparius Michx.
Little Bluestem

Plant: *Schizachyrium scoparium* is a native species that grows 80–100 cm tall. It is a clump-forming perennial with a short rhizome and an open, purplish, upright flowerhead.
Leaves and Stem: The stem has grooves above the nodes. The smooth sheath is usually strongly keeled. The ligules are 1–1.5 mm long and have a finely hairy or finely jagged margin. Flat to folded leaf blades are 2–5 mm wide and are smooth to sparsely hairy.
Flowerhead and Flowers: The flowerhead consists of several 3- to 5-cm-long loose spikes. Branches of the flowerhead each end in spikelets of two forms. The fertile spikelet has no stalk and a 10- to 13-mm-long twisted awn; the sterile spikelet is stalked with a 1- to 4-mm-long awn. There are two sterile spikelets. The central rachis of the spikelet is covered in fine white hairs. The lemma is shorter than the longest glume.
Habitat: Little Bluestem grows on dry sites in the lower montane zones. In British Columbia it occurs only at Fairmont Hot Springs, Kikomun Provincial Park and near the Bull River. It is Red listed by the Conservation Data Centre. (Douglas et al. 1998)
Similar Species: The branched purple flowerhead distinguishes Little Bluestem from other species.



This genus has two species worldwide; one in eastern Asia, the other in Eurasia and North America. The name *Scolochloa* comes from the Greek *scolops*, which means prickle, and *chloa*, which means grass. The species occurring in British Columbia is not prickly.

Scolochloa festucacea (Willd.) Link
Fluminea festucacea (Willd.)
Rivergrass

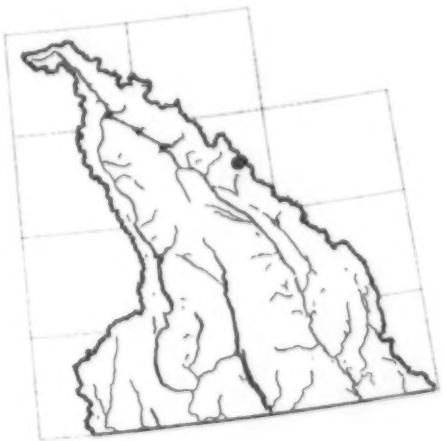
Plant: *Scolochloa festucacea* is a native species that grows 1–1.5 m tall. It is a stout perennial with a thick rhizome. The flowerhead is long and open, and the long branches are mostly naked below the midpoint, with the spikelets located at the end of branches.
Leaves and Stem: The papery sheaths are open. The membrane-like ligule is 2–6 mm long and ragged along the edge. Flat leaf blades are 5–10 mm wide with long slender tips and a rough upper surface. There are no ligules.
Flowerhead and Flowers: The open flowerhead is 15–25 cm long and the diverging branches are upward-pointing and mostly naked below the midpoint. The spikelets are three- to four-flowered. The unequal glumes are thin and pointed and the longest glume is equal in length to the lemma of the first flower. There are no awns, but the glumes and the lemmas are pointed. The lemmas have seven noticeable nerves that are raised and converge at the tip.

Habitat: Rivergrass is a Blue-listed species in the B.C. Conservation Data Centre database. (Douglas et al. 1998) It grows in standing water of shallow ponds along streambanks and lakeshores in the steppe and montane zones. It has a restricted distribution in British Columbia, and in the Columbia Basin region it is found only at Grasmere and Canal Flats.
Similar Species: Superficially, Rivergrass resembles the hybrid *Festulolium*, but the presence of the rhizome in Rivergrass is diagnostic.

Secale is the classical name for rye, and the genus contains five Old World species. A small amount of *Secale cereale* is cultivated in North America and occasionally it grows along roadsides and in waste places, but never becomes established outside cultivation.

***Secale cereale* L.**
Rye

Plant: *Secale cereale* is an introduced species that grows 60–150 cm tall. It is a tufted annual with a dense, bushy, terminal spike.
Leaves and Stem: The sheaths are open and have prominent auricles. The ragged membrane-like ligules are 1 mm long. The flat leaf blades are 3–10 mm wide with a smooth to rough surface.
Flowerhead and Flowers: The flowerhead consists of a bushy terminal spike that is 8–15 cm long, often nodding slightly. Two flowers are contained in each spikelet. The equal glumes are stiff, slender, and about 1/2 as long as the lemma. The lemmas are keeled and curved, with stiff hairs along the keel as well as the exposed edges. The lemma awns are 4–7 mm long and give the spike a bushy look.
Habitat: Rye was introduced from Eurasia as a cultivated cereal and occurs occasionally in disturbed sites and roadsides, but rarely persists in British Columbia. In the Columbia Basin region there is a single record of occurrence at Yoho National Park along a railway embankment.
Similar Species: Rye has a distinctive form and is often dried for commercial flower arrangements.



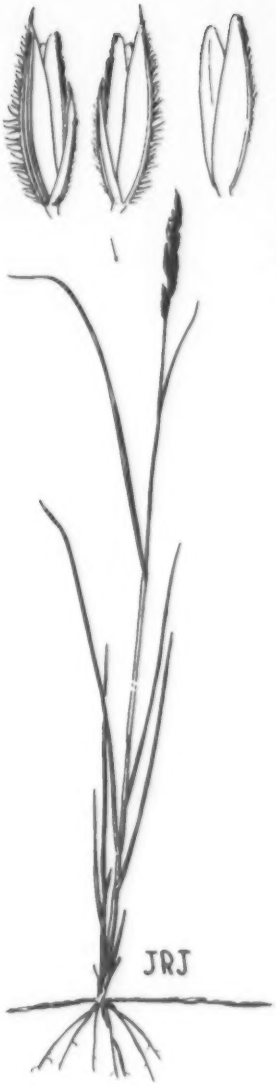
There are approximately 100 species of *Setaria* worldwide, mostly in tropical locations. This weedy genus commonly occurs along drainage ditches and on irrigated land. *Seta* is bristle in Latin, in reference to the sterile bristles beneath the spikelet.

Setaria viridis (L.) Beauv.
Green Bristlegrass

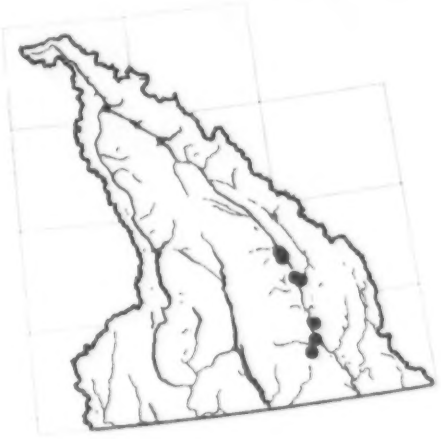
Plant: *Setaria viridis* is an introduced species that grows to 1 m tall. It is an annual with an occasionally bending culm base. The bristly spike flowerhead resembles a woolly caterpillar.
Leaves and Stem: The smooth, open sheath has a slightly hairy collar. The half-membrane ligules are 2 mm high and have a hairy upper edge. The flat leaves are smooth with slight hairiness at the throat. There are no auricles.
Flowerhead and Flowers: The spike-like flowerhead is rarely longer than 10 cm. The two-flowered spikelets have two to four sterile bristles below the fertile flower. The fertile lemma and palea are enclosed by a second glume and a sterile lemma.
Habitat: This species is probably common in the Columbia Basin region, but there is only one specimen in the Royal BC Museum collected from Revelstoke along the railway bed.

Species in this small genus typically bear one-flowered spikelets packed tightly together on one side of the inflorescence axis. *Spartina* is a genus characteristic of coastal saltmarshes, but also occurs in inland alkaline habitats. The name originates from the Greek word *spartine*, a term refering to the cord woven from *Spartina juncea*, a European species.

Spartina gracilis Trin.
Alkali Cordgrass



Plant: *Spartina gracilis* is a native species that grows 30–60 cm tall. It is a perennial with stout rhizomes and a spike-like flowerhead that consists of compressed spikelets in two rows on one side of the spike axis.
Leaves and Stem: The sheaths are open and there are no auricles. Ligules consist of a fringe of fine hairs 1 mm high. The rough leaves are sometimes inrolled or sometimes not. When inrolled, they are not more than 5 mm wide at the base.
Flowerhead and Flowers: The spike-like flowerhead consists of compressed spikelets arranged in two rows along one side of the stem axis. The unequal glumes (one is 1/2 the size of the other) are hairy on the keel and pointed. The blunt lemma is equal in size to the shorter glume.
Habitat: Alkali Cordgrass grows in marshes, wet ditches and meadows, and dry, often saline sites. In the Columbia Basin region it occurs at Kootenay, Windermere, Cranbrook, and Armstrong Bay, and along the Saint Mary's River.
Similar Species: Two species of *Spartina* occur in British Columbia: *S. gracilis* and *S. patens*. *Spartina patens* inhabits coastal saltmarshes.

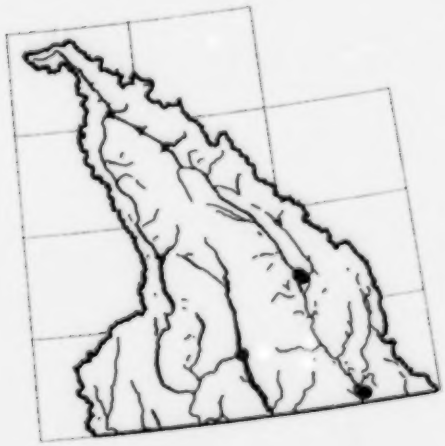


This small genus is native to North America, occurring generally in moist sites. Though palatable to livestock, it rarely occurs in abundance in northwest North America. Wedge-shaped glumes are responsible for the botanical name—*sphen* in Greek means wedge, and *pholis* in Greek means scale.

Sphenopholis obtusata (Mich.) Scribn.
Prairie Wedgegrass

Plant: *Sphenopholis obtusata* is a native species with two varieties. Variety *obtusata* grows 20–80 cm tall. Variety *major* grows 30–110 cm tall. It is a tufted perennial. Variety *major* has a narrow, open flowerhead; and variety *obtusata* has a dense flowerhead.
Leaves and Stem: The smooth or rough or long-haired sheaths are open. There are no auricles. The ligules are 1.5–2 mm long and membrane-like, with rough or toothed margins. Flat leaf blades feel soft-hairy or rough to the touch and are 3–5 mm wide.
Flowerhead and Flowers: The open to spike-like flowerhead is 5–15 cm long, and has upright branches. In both varieties the flowerhead appears crowded with a large number of spikelets along the branches. Spikelets consist of one or two flowers. The glumes are rough-looking; the first is narrow and the second appears almost hood-like or wedge-shaped. Glumes are shorter than the the lemma. Lemmas are oblong and rarely awned.

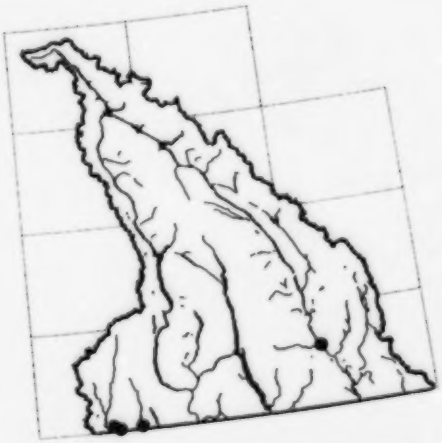
Habitat: Prairie Wedgegrass grows in moist meadows, shallow ponds, and hot springs in the steppe and montane zones. In the Columbia Basin region, it occurs at Edward's and Loon Lakes in the Grasmere area, Fairmont Hot Springs, and Pilot Bay Provincial Park. Both varieties of this species are Red listed by the B.C. Conservation Data Centre (Douglas et al. 1998).
Similar Species: The dense, spike-like flowerhead, as well as the hood- or wedge-shaped glume, make this a distinctive grass.



There are about 100 species in the *Sporobolus* genus. It occurs in warm dry habitats (deserts) in the New and Old World. The botanical name derives from the Greek *spora*, for seed, and *ballein*, meaning "to throw," because the seeds often drop or are thrown from their casing.

Sporobolus cryptandrus (Torr.) A. Gray
Sand Dropseed

Plant: *Sporobolus cryptandrus* is a native species that grows 30–70 cm tall. It is a strongly tufted perennial with a somewhat open flowerhead and spikelets to near the branch base.
Leaves and Stem: The stems are solid and strongly grooved. Open sheaths are smooth except along the edges and at the collar (where the sheath meets the blade). Here, a conspicuous ring of white hairs 2–3 mm long are attached. The ligules exist as a fringe of hairs 0.5–0.7 mm long. The smooth, inrolled or flat leaf blades are 2–5 mm wide.
Flowerhead and Flowers: The stiff, upward-pointing branches of the flowerhead have spikelets to near the base and the sheath can often partially enclose the flowerhead. The glumes are sharply pointed and unequal—the first is 1 mm long and the second is nearly twice as long. The lemma is as long as the second glume or slightly longer.
Habitat: Sand Dropseed grows on moderately moist to dry sandy or gravelly sites in the steppe and montane zones. It often occurs with Indian Ricegrass (*Stipa hymenoides*). In the Columbia Basin region, Sand Dropseed occurs at Midway, Grand Forks, and Fort Steele.
Similar Species: There are four species of *Sporobolus* in British Columbia, and two of these—Hairgrass Dropseed (*Sporobolus airoides*) and Rough Dropseed (*Sporobolus asper*)—are Red-listed by the B.C. Conservation Data Centre (Douglas et al. 1998). Neither of these occurs in the Columbia Basin region. Hairgrass Dropseed is more common southward, and Rough Dropseed is found to the south and east, and in British Columbia is known only from Osoyoos and Keremeos.



Although we have kept the *Stipa* species in their traditional grouping, the genus *Stipa* has recently had some rearrangement. The species found in British Columbia have been moved to two genera. The long-awned *Stipa* are now called *Hesperostipa* and are differentiated by the sharp callus that is 1/5 or more the length of the flower and the awns that are 4–30 cm long. The non-long-awned native species have been moved to *Achnatherum*. The new key for the *Stipaea* adapted from Barkworth (1999) has *Achnatherum* separated from *Piptatherum (Oryzopsis)* by callus shape and length, and flower shape. *Achnatherum* is separated from *Hesperostipa* by callus shape and length, as well as by awn length. Those species remaining in *Stipa* are introduced, cultivated species of which there are none in British Columbia. These changes have been part of Hickman (1993) and will be part of the *Manual of Grasses* (Barkworth).

Douglas 1994	Barkworth 1999
Stipa comata	*Hesperostipa comata* (Trin. & Rupr.) Barkw.
Stipa curtiseta	*Hesperostipa curtiseta* (A.S. Hitchc.) Barkw.
Stipa spartea	*Hesperostipa spartea* (Trin.) Barkw.
Stipa hymenoides	*Achnatherum hymenoides* (Roemer & Schultes) Barkw.
Stipa nelsonii var. *dorei*	*Achnatherum nelsonii* (Scribn.) Barkw. ssp. *dorei* (Barkw. & Maze) Barkw.
Stipa occidentalis	*Achnatherum occidentale* (Thurber) Barkw. ssp. *pubescens* (Vasey) Barkw.
Stipa richardsonii	*Achnatherum richardsonii* (Link) Barkw.

Stipa species are important range grasses, but the sharp awns of some of the species may hurt grazing stock such as sheep.

***Stipa*—Adapted from Barkworth (1999) and Douglas et al. (1994)**

1a. Callus sharp, 2.5–5 mm long; flowers 4–25 cm long; awns 4–30 mm long (*Hesperostipa*) 2

2a. Lemmas evenly hairy at maturity; tip of awns usually flexible and at right angles to flower axis; ligules of basal leaves thin . . . . *Stipa comata*

2b. Lemmas with lines of hair or evenly hairy at maturity; tip of awn usually straight and parallel to flower axis despite bend lower down on the awn; ligules of basal leaves thick 3

3a. Lemmas 12–16 mm long; awns 10–17 mm long; lower stem nodes hairy . . . . . *Stipa spartea*

3b. Lemmas 7–11 mm long; awns 5–9 mm long; lower stem nodes smooth . . . . . *Stipa curtiseta*

1b. Callus blunt to sharp, less than 2 mm long; awns up to 8 cm long (*Achnatherum*) 4

4a. Flowerhead branches open and spreading 5

5a. Awns less than 1 mm long and falling off at maturity... ..... *Stipa hymenoides*

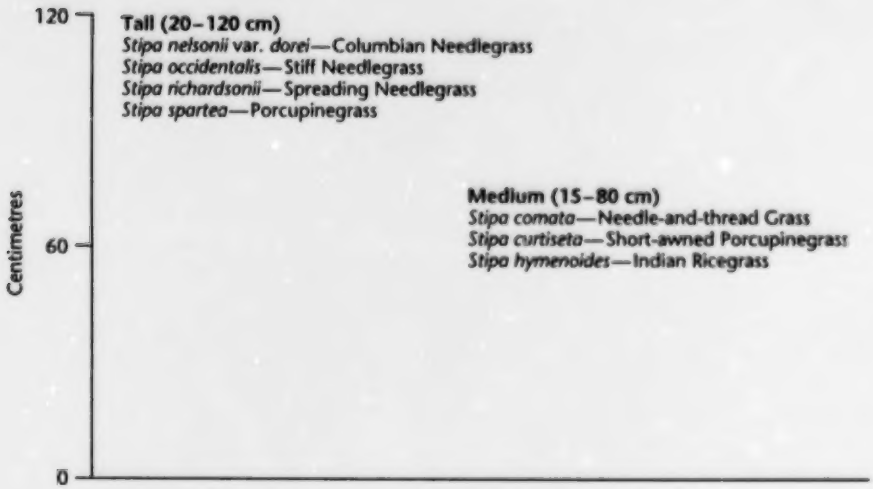
5b. Awns greater than 1 mm long and remaining attached at maturity ..... *Stipa richardsonii*

4b. Flowerhead branches pressed close to axis and pointed upwards 6

6a. First segment of awns hairy, with hairs about 1 mm long... ..... *Stipa occidentalis*

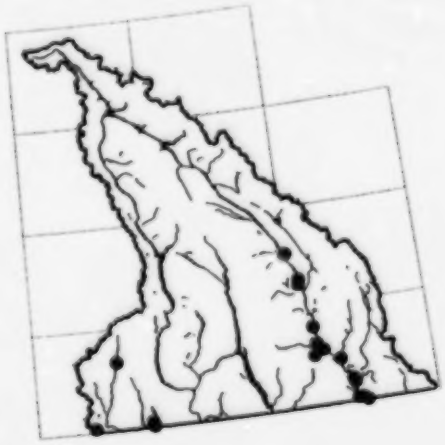
6b. First segment of awns rough, with hairs less than 0.5 mm long.... ..... *Stipa nelsoni*

Heights of *Stipa* species



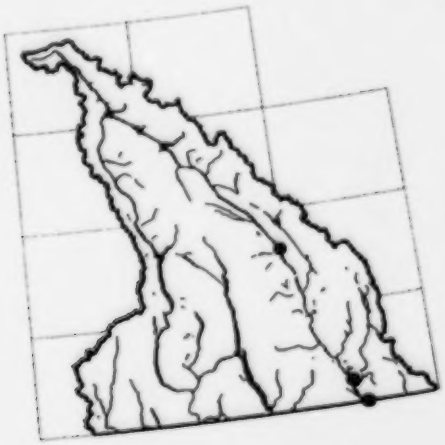
Stipa comata Trin. & Rupr.
Hesperostipa comata (Trin. & Rupr.) Barkw.
Needle-and-thread Grass

Plant: *Stipa comata* is a native species that grows to 70 cm tall. It is a tufted perennial bearing a somewhat narrowed flowerhead with long awns.
Leaves and Stem: Erect, somewhat leafy stems arise from a tuft of basal leaves. Sheaths are open and there are no auricles. The leaf blades are 1–2 mm wide and usually inrolled. The membrane-like (or at least translucent) ligule is 3–5 mm long and has a rounded and split-to-torn margin.
Flowerhead and Flowers: The flowerhead is somewhat narrow, reaching 7–20 cm long. The one-flowered spikelets are attached close to the central axis of the flowerhead. There are two, almost equal, narrow, persistent glumes, ranging from 15 to 25 (mostly 20) mm long. The lemmas are 8–12 mm long, hardened, and attached at the base to a sharp-pointed callus. The callus and the lemma are covered in stiff hairs, but the covering on the lemma surface is sparse. The long, slender awns twist many times from the tip of the lemma and bend once or more along their length. The awn tip is usually flexible. Awns may reach 15 cm long.
Habitat: *Stipa comata* grows widely in dry, open valley bottoms and adjacent slopes in much of the Columbia Basin region and specimens have been collected at Invermere, Kikomun Provincial Park, Cranbrook, and Columbia Lake. It is a characteristic grassland species.
Similar species: Needle-and-thread Grass can be confused with two other long-awned species in the Columbia Basin region: Short-awned Porcupine Grass (*S. curtiseta*) and Porcupinegrass (*S. spartea*). The tips of the awns of Needle-and-thread Grass are usually flexible and curved, whereas those of the other two species tend to be straight. The lemmas of Needle-and-thread Grass have hairs over the entire surface, whereas those of the other species are more or less hairless or have hairs arranged in zones (lines) along the length of the lemma, leaving narrow strips or grooves hairless. The ligules of the lower and basal leaves are thin in Needle-and-thread Grass and thick and firmer in the other two species. Porcupinegrass is an uncommon Blue-listed species with 10- to 18-cm-long awns. Needle-and-thread Grass is called *Hesperostipa comata* in Hickman (1993).



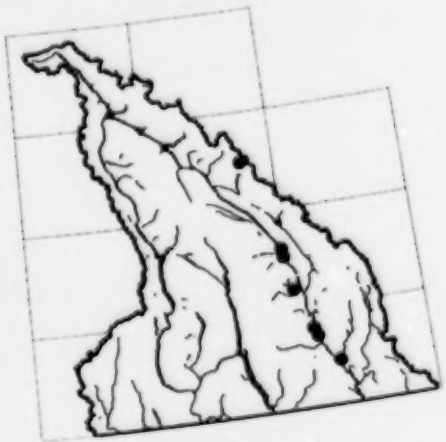
Stipa curtiseta (A.S. Hitchc.) Barkw.
Hesperostipa curtiseta (A.S. Hitchc.) Barkw.
Short-awned Porcupine Grass

Plant: *Stipa curtiseta* is a native species that grows 30–80 cm tall. It is a tufted perennial bearing a somewhat narrowed flowerhead with long awns.
Leaves and Stem: Erect, somewhat leafy stems arise from a tuft of basal leaves. Sheaths are open and there are no auricles. Flat to inrolled leaf blades are 2–5 mm wide. The stiff, relatively thickened, relatively short ligule is 0.5–3 mm long and has a rounded and somewhat hairy margin. Ligules of the lower and basal leaves tend to be short and thickened.
Flowerhead and Flowers: The flowerhead is narrowed, reaching 10–20 cm long. The one-flowered spikelets are attached to branches held close to the central axis. There are two, narrow, almost equal glumes that are 2–3 cm long, and longer than the lemma (not including the awn). The lemmas are 7.5–11 mm long, hardened, and attached at the base to a sharp-pointed callus. The callus is covered in stiff hairs. The lemma surface may be smooth or covered in hairs arranged in lengthwise strips or lines. Between the strips there are smooth areas or grooves. The slender awns twist many times from the tip of the lemma, and bend once or more along their length. The awn tip is usually straight. Awns range from 5 to 9 cm long.
Habitat: Short-awned Porcupine Grass occurs on dry, open slopes of lower elevations throughout the Columbia Basin region. It has been collected at Kikomun Creek Provincial Park, Roosville, and Radium Hot Springs.
Similar Species: See the description for Needle-and-thread Grass. Short-awned Porcupine Grass is separated from the very similar Porcupinegrass most easily on the basis of awn length. The awns of Short-awned Porcupine Grass are less than 10 cm long and the lemmas are also relatively short (7.5–10 mm). Both lemmas and awns of Porcupinegrass are longer. Porcupinegrass is an uncommon Blue-listed species found mainly around Castlegar, whereas Short-awned Porcupine Grass is more widespread, based on the Royal BC Museum's Herbarium records. Hitchcock et al. (1969, p. 717) consider this to be a somewhat dwarfish phase of Porcupinegrass.



Stipa hymenoides Roem. Schult.
Achnatherum hymenoides (Roem. & Schult.) Barkw.
Oryzopsis hymenoides [Roem. & Schult.] Ricker in Piper
Indian Ricegrass

Plant: *Stipa hymenoides* is a native species that grows 30–60 cm tall. It is a densely tufted perennial with several stiff stems and an open, branched flowerhead.
Leaves and Stem: Several stems arise from a tuft of 1-mm-wide, long leaves. Sheaths are open and there are no auricles. The leaves are generally smooth and strongly inrolled. The smooth-edged to torn ligules are 6 mm long and easy to see.
Flowerhead and Flowers: The wide, open flowerhead is 8–16 cm tall and has spikelets distributed at the tips of widely spread branches. Each spikelet has a single flower with rounded and pointed glumes that are 5–9 mm long and wrap around the flower. One glume is slightly longer than the other and exceeds the lemma—which is 4–6 mm long—but not its awn. An obvious mass of dense, long, white hairs covers the dark (reddish) oval lemma. A stout, 4- to 6-mm-long awn extends from the tip of the lemma.
Habitat: Indian Ricegrass grows at low elevations in dry, open grasslands and slopes, especially on rocky or sandy soils. It is scattered throughout the Columbia Basin region at locations such as Windermere Lake, Wasa, Canal Flats, and Yoho National Park.
Similar Species: The rounded glumes in combination with long lemma hairs are unlike those of other *Stipa* species. The persistent awns and broad flowerhead differentiate Indian Ricegrass from *Oryzopsis* species.



Stipa nelsonii Scribn. var. ***dorei*** Barkw. & Maze
Stipa columbiana auct. non Macoun
Columbian Needlegrass

Plant: *Stipa nelsonii* is a native species that grows 10–120+ cm tall. It is a tufted perennial with a narrow, spike-like, bristly flowerhead.
Leaves and Stem: Open sheaths vary from smooth to densely hairy. There are no auricles. Inrolled to flattened leaf blades are 1–4 mm wide and 10–30 cm long. The ligules are 0.2–1.2 mm long and have a rounded to chopped-off form.
Flowerhead and Flowers: The narrowed flowerhead ranges from 9 to 30 cm long. Branches (as many as six at the lowest node) are straight and more or less pressed against the axis (appressed and ascending). The narrowed glumes are longer than the single flower. Of the two glumes, one is slightly longer than the other (6.4–10.5 mm long). The lemma is 4–6 mm long and covered in white hairs. Awns are 2–3 cm long and twice bent. The lowest segment of the awn is rough, but not covered in hairs.
Habitat: Columbian Needlegrass is a native species that grows in open, mesic to dry slopes and forest openings from valley bottoms to subalpine elevations. In the Columbia Basin region it grows at Fairmont Hot Springs, Natal, Midway, Trail, Kikomun Creek Provincial Park, and Grand Forks. In the Columbia Basin region, Columbian Needlegrass increases after prescribed burns in the spring (G. Berg, pers. comm. 1999).

Similar Species: Columbian Needlegrass has a narrowed, somewhat spike-like flowerhead compared to Spreading Needlegrass (*Stipa richardsonii*). The first two segments of the awns of Columbian Needlegrass have short hairs or are only rough, whereas those of Stiff Needlegrass (*S. occidentalis*) have 1-mm-long hairs. For more details on this species and its relationship to related species, consult Barkworth et al. (1979).

Stipa occidentalis Thurb. ex S. Wats. var. ***pubescens*** Maze, Taylor & MacBryde
Achnatherum occidentale (Thurber) Barkw.
ssp. ***pubescens*** (Vasey) Barkw.
Stiff Needlegrass

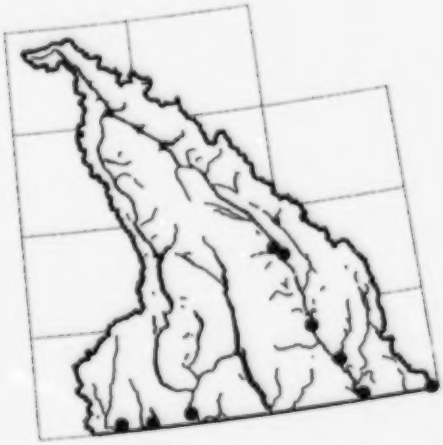
Plant: *Stipa occidentalis* is a native species that grows 40–120 cm tall. It is a strongly tufted perennial with a medium to long, spiky and bristly flowerhead.

Leaves and Stem: Sheaths are open and smooth or hairy. There are no auricles. The leaves are 1–5 mm wide, stiff, and usually inrolled. The ligule is about 0.5 mm long.

Flowerhead and Flowers: The flowerhead is 8–20 cm long, narrow, and spike-like, with protruding, bristly awns. The two nearly equal glumes are longer than the single flower. A 3- to 4-cm-long bent, twisted awn extends from the tip of the hairy lemma. The lowest two segments of the twice-bent awn are covered in hairs, making them look feathery.

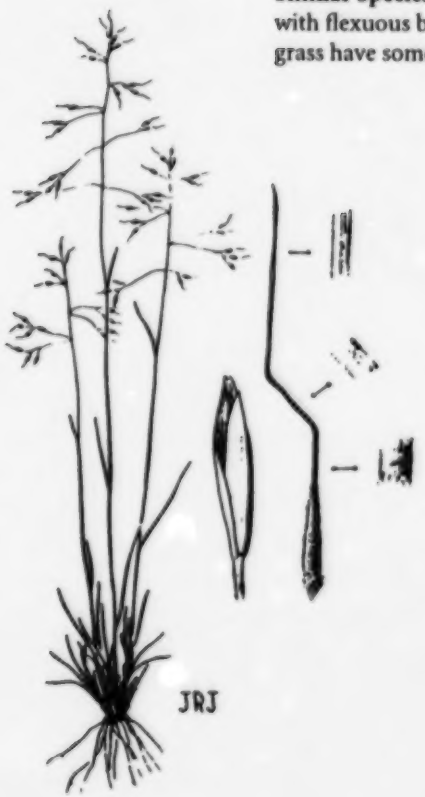
Habitat: Stiff Needlegrass occurs on open, dry, grassy slopes and in forest openings from valley bottom to mid-slope. It has been collected from Tobacco Plains, Invermere, Midway, and Mount Morrissey in the Columbia Basin region.

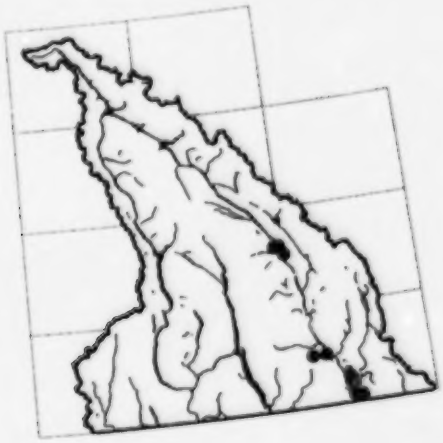
Similar species: Stiff Needlegrass has a narrowed to somewhat spike-like flowerhead compared to Spreading Needlegrass. The first two segments of the awns of Stiff Needlegrass have 1-mm-long hairs, whereas those of the similar Columbian Needlegrass have short hairs, or are only rough.



Stipa richardsonii Link
Achnatherum richardsonii (Link) Barkw.
Spreading Needlegrass

Plant: *Stipa richardsonii* is a native species that grows 40–100 cm tall. It is a tufted, often purplish perennial with a sparse, open, drooping flowerhead.
Leaves and Stem: Several stems rise from a tuft of basal leaves. Leaf sheaths are open and smooth to slightly hairy. There are no auricles. The leaf blades are 1.5–3.0 mm wide and usually folded to slightly inrolled, and may feel a little rough. The ligules are 0.5 mm long and higher at the sides than at the middle.
Flowerhead and Flowers: The sparse, open flowerhead ranges from 7 to 20 cm high. Its spreading branches often droop and have only a few single-flowered spikelets near the tips. The two narrow glumes (8–10 mm long) are slightly longer than the first flower (not including the awn). One glume is noticeably shorter than the other. The lemma is 5–6 mm long and bears an 18- to 25-mm-long awn at the tip. The awn is twice bent, of which the first segment is hairy, the second segment less hairy, and the last portion is only rough to the touch.
Habitat: Spreading Needlegrass grows in low-elevation grasslands and montane openings in forests, most often with pines or Douglas-fir. Spreading Needlegrass may form solid stands at the edge of the forest. It occurs throughout the Columbia Basin region and has been collected at Radium Hot Springs, Invermere, Kikomun Creek Provincial Park, and Waldo (now submerged under Lake Koocanusa).
Similar Species: Spreading Needlegrass has an open, spreading flowerhead with flexuous branches, whereas Stiff Needlegrass and Columbian Needlegrass have somewhat spike-like flowerheads.





Stipa spartea Trin.
Hesperostipa spartea (Trin.) Barkw.
Porcupinegrass

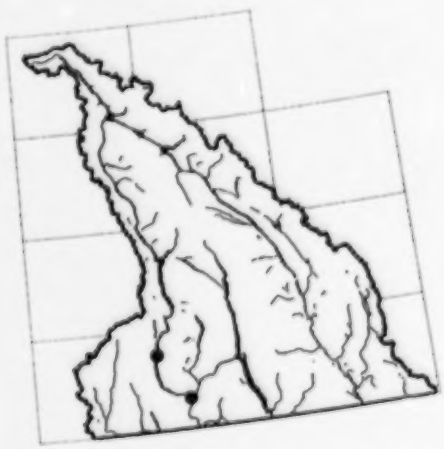
Plant: *Stipa spartea* is a native species that grows 70–120 cm tall. It is a tufted perennial that bears a somewhat narrowed flowerhead with extremely long awns.

Leaves and Stem: Erect, somewhat leafy stems arise from a tuft of basal leaves. Sheaths are open and there are no auricles. Flat to inrolled leaf blades are 1–5 mm wide. The thickened ligule is 0.5–3 mm long and has a rounded and somewhat hairy margin. Ligules of lower and basal leaves tend to be short and thickened.

Flowerhead and Flowers: The flowerhead is somewhat narrowed, reaching 10–20 cm long. The one-flowered spikelets are attached close to the central axis. There are two glumes that are almost equal, 3–4 cm long, narrow, and much longer than the lemma (not including the awn). The lemmas are 12–16 mm long, hardened, and attached at the base to a sharp-pointed callus. The callus is covered in stiff hairs. The lemma surface may be smooth or covered in hairs arranged in zones or strips. Between the strips there are smooth zones or grooves. The slender awns twist many times from the tip of the lemma, and bend once or more along their length. The awn tip is usually straight. Awns range from 10 to 17 cm long.

Habitat: Porcupinegrass grows in open, grassy habitats of lower valley slopes. It is known from Castlegar in the Columbia Basin region, but may occur at other scattered localities. Porcupinegrass has not been recently collected in the Columbia Basin region, and is Blue listed by the the B.C. Conservation Data Centre. There is no specimen of it from the Columbia Basin region in the Royal BC Museum's collection.

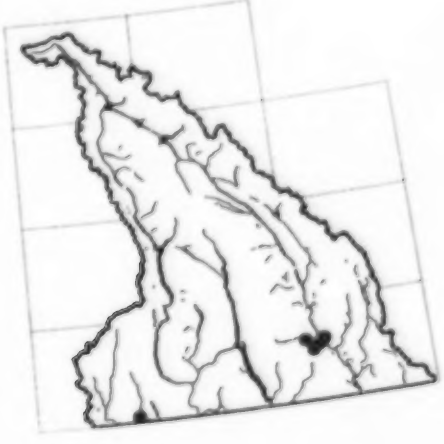
Similar Species: Porcupinegrass is most easily recognized by its extremely long, twisted awns. See Needle-and-thread Grass and Short-awned Porcupine Grass. Porcupinegrass is included by some authors in *Hesperostipa*.



This genus is the centre of some controversy due to the re-interpretation of *Agropyron*. Several species that were originally included in *Agropyron* by Hitchcock (1951) have been placed in this genus. The species in this genus originate in the Mediterranean region, have been cultivated for forage and erosion control, and are well suited to alkaline soils. In British Columbia there are two *Thinopyrum* species—*T. ponticum* and *T. intermedium*—but only *T. ponticum* has been collected. *T. intermedium* (syn. *Agropyron intermedium*) is likely to occur in the Columbia Basin region in the future as an introduced species.

Thinopyrum ponticum (Podp.) Z.W.Liu & R.R.-C. Wang
Elymus elongatus (Host) Runemark ssp. ***ponticus*** (Podp.) Meld.
Agropyron elongatum (Host) Beauv. in part.
Tall Wheatgrass

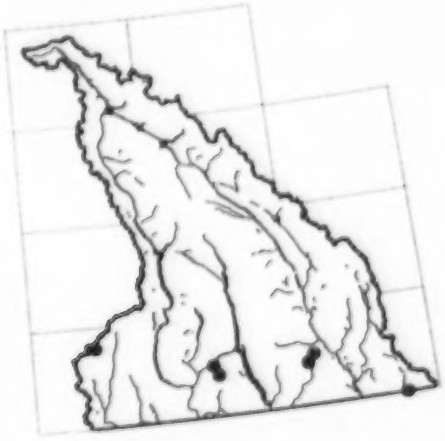
Plant: *Thinopyrum ponticum* is an introduced species that grows 50–200 cm tall. It is a tufted perennial with no rhizomes. The flowerhead is a stiff, slender spike.
Leaves and Stem: The open leaf sheath is hairy along the margins but smooth across the back of the sheath. The ligules are inconspicuous, consisting of small hairs. The stiff leaf blade is 2–6.5 mm wide, rolled inward, and thick-veined, but the margins are not thickened. The auricles are 0.2–1.5 mm long and erect rather than clasping the stem.
Flowerhead and Flowers: The slender spike is stiff and 10–42 cm long. The glume tip is blunt and the glumes are weakly keeled. The glumes are shorter than the first flower. The spikelets are slightly longer than the internodes to more than twice as long. The lemmas are prominently nerved and have blunt tips with either no awns or are minutely awn-tipped. The stem axis in the flowerhead does not break apart at maturity.
Habitat: Tall Wheatgrass is common in the southern Columbia Basin region and was introduced from southeastern Europe and western Asia for forage and soil stabilization. It grows along dry roadsides and on dry slopes in the steppe to alpine zones. In the Columbia Basin region it occurs near Cranbrook, Marysville, and Grand Forks.
Similiar species: The spikelets of Tall Wheatgrass and of Intermediate Wheatgrass both have a blunt, club-like appearance due to the lack of awns, but they differ most notably in their leaf blade edges. Intermediate Wheatgrass has thickened leaf blade edges with some hairiness on the upper surface and it has a rhizome. Tall Wheatgrass has no thickened margins and the blades are rough or densely hairy. It is tufted rather than having a rhizome. This species is called *Elymus elongatus* in Douglas et al. (1994), and is similiar to *E. hispidus* in Douglas et al. (1994).



A number of species formerly contained in *Glyceria* have been moved into *Torreyochloa* and *Puccinellia*. All three genera have awnless lemmas and lemma nerves that are parallel rather than meeting at the tip. The five lemma nerves of *Puccinellia* are less obvious. The five to seven nerves of *Torreyochloa* and *Glyceria* are raised. *Torreyochloa* has open to partially open leaf sheaths in contrast to *Glyceria*, which has closed leaf sheaths. *Torreyochloa* was named after J. Torrey, an early American botanist. The two species of *Torreyochloa* in British Columbia are *T. pallida* and *T. pauciflora*.

Torreyochloa pauciflora (J.S. Presl.) Church
Weak False-manna

Plant: *Torreyochloa pauciflora* is a native species that grows 30–150 cm tall. It is a perennial that is often bent at the base, with well-developed rhizomes and a broad, open flowerhead.
Leaves and Stem: The lower part of the stem may rest on or near the surface and root at the nodes. Sheaths are open to partly closed. The leaf blades are flat and 3–15 mm wide, and feel slightly rough to the touch. There are no auricles. The ligule is 3–9 mm long and has a pointed, tattered tip.
Flowerhead and Flowers: The flowerhead is 5–20 cm long, open, and rather loose. The two to three branches per node are perpendicular to the stem axis or even drooping. Spikelets are three- to seven-flowered. Two, small, unequal glumes are much shorter than the first flower. Lemmas are 2–3 mm long, have rounded margins, and have a purple band just below the edge of the margin.
Habitat: False-manna grows in the shallow water of marshes, swamps, and wet meadows in sites such as Sage Creek in the Flathead, at Nelson, and near Cranbrook.
Similar Species: You can tell Weak False-manna from other alkaligrasses (*Puccinellia* spp.) by its long prominent ligule and wide leaf blades. Technically, it has more prominent nerves on the lemma. Weak False-manna is also known as *Puccinellia pauciflora* (Presl) Munz, and *Glyceria pauciflora* J.S. Presl in C.B. Presl.



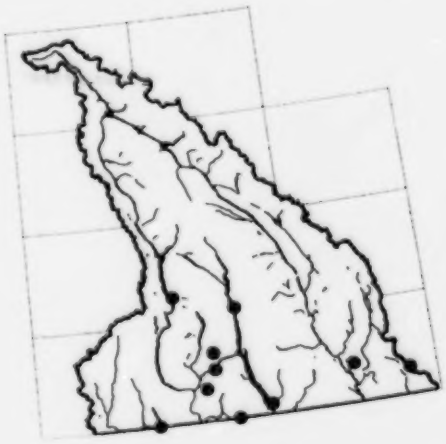
Trisetum are fairly palatable grasses, but they are not abundant as forage. In the alpine zone, *Trisetum spicatum* is an important forage for deer and goats. *Trisetum* is from the Greek words *treis*, meaning three, and *seta* meaning bristles, referring to the three awns on the type specimen for the genus.

***Trisetum*—Adapted from Douglas et al. (1994)**

1a. Lemmas awnless or with awns that rarely exceed 1 mm . . . *Trisetum wolfii*
1b. Lemmas awned; awns exceed length of lemmas 2
2a. Flowerhead spike-like, dense; basal leaf sheaths hairy and upper glume not much longer than lower one (almost equal). . . . . *Trisetum spicatum*
2b. Flowerhead not spike-like but open and loose; basal leaf sheaths smooth and upper glume much longer than lower one. . . . . *Trisetum cernuum*

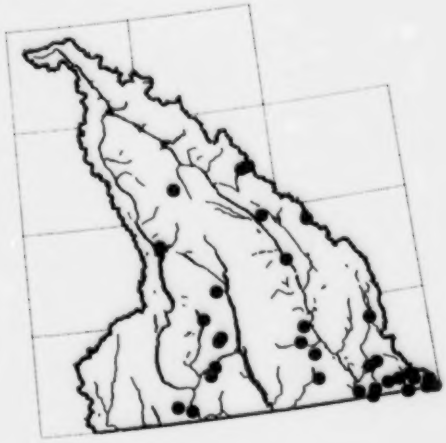
Trisetum cernuum Trin.
Nodding Trisetum

Plant: *Trisetum cernuum* is a native species 10–70 cm tall. It is a tuft- forming perennial with few-flowered, nodding flowerheads.
Leaves and Stem: Sheaths are open. The drooping, flat leaf blades are 5–12 mm wide. The leaves have thin, prominent tips. There are no auricles. The ligules are well developed and 1.5–3 mm long.
Flowerhead and Flowers: The flowerhead is widely branched and sparse, bearing a few spikelets at the end of drooping branches. The second or inside glume is much larger than the first and has a sharp tip that extends from two teeth at the top of the glume. The lemmas of the two flowers each have a 10-mm-long bent awn.
Habitat: Nodding Trisetum grows in moist woods and forests, and on streambanks. In the Columbia Basin region it occurs in several lakes around Nelson, at Nakusp, and along the Pend'Oreille River.
Similar Species: There are two varieties of Nodding Trisetum in British Columbia: *cernuum* and *canescens*. Variety *cernuum* has an open, lax or drooping flowerhead and 6- to 11-mm-wide leaves, and is most often found along the coast; whereas variety *canescens* has a narrow, interrupted flowerhead, upward-pointing branches, and 4- to 7-mm-wide leaves. Nodding Trisetum resembles Spike Trisetum (*T. spicatum*). Spike Trisetum and Nodding Trisetum each have awns, but they are differentiated by the flowerhead type and the glumes. The flowerhead of Spike Trisetum is spike-like and the upper glume is not much longer than the lower one, whereas the flowerhead of Nodding Trisetum is open to narrow and nodding but not spike-like, and the upper glume is much longer than the lower one.



Trisetum spicatum (L.) Richt.
Spike Trisetum

Plant: *Trisetum spicatum* is a native species that grows 50–70 cm tall. It is a densely tufted perennial with an often interrupted, dense, spike-like flowerhead.
Leaves and Stem: The stem and leaves are often hairy or rough to the touch. The sheath is open and keeled at the upper end. The ligules are 0.5–2 mm high, ragged along the edge, and hairy throughout. Flat or folded leaves are 1.5–5 mm wide and finely hairy.
Flowerhead and Flowers: The narrow flowerhead is spike-like and 2–15 cm long, most often purplish, tawny, or silver coloured. The spikelets contain two to three flowers. Almost equal, membrane-like glumes are rough along the keel and surpass the first flower. Lemmas are rough to the touch and have a bent awn that is 5–6 mm long, arising 1.5 mm from between two teeth at the tip.
Habitat: Spike Trisetum grows on moist to dry sites in all zones, and often occupies rocky sites. It is common throughout the Columbia Basin region and occurs at Windermere, Flathead, Mount Assiniboine Park, Nelson, Yoho National Park, and New Denver.
Similar Species: Spike Trisetum is highly variable and some authors have recognized several subspecies, but at this time Douglas et al. (1994) recognize only the one species.



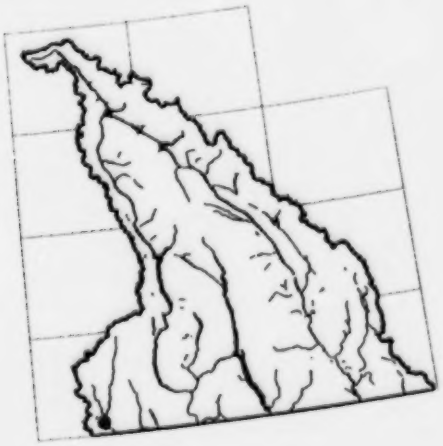
Trisetum wolfii Vasey
Wolf's Trisetum

Plant: *Trisetum wolfii* is a native species that grows 40–80 cm tall. It is a perennial that occurs as a loosely tufted form or has a rhizome-bearing form. The flowerhead is a narrow spike that is purplish before complete maturity.
Leaves and Stem: The open sheaths feel rough, though they also sometimes have soft hairs. The ligules are 2.5–4 mm high and have a blunt shape and ragged hairs along the margins. Flat leaf blades are 2–6 mm wide. There are no auricles.
Flowerhead and Flowers: The narrow spike-like flowerhead has short branches that point upward. Purplish spikelets are two- to three-flowered. Glumes are equal in length to, or exceed, the first flower. The blunt lemmas are 4.5–6.5 mm long. The callus has sparse hairs on it. The stem between the flowers is also sparsely hairy. There are no awns, and this feature distinguishes this species from other *Trisetum*.
Habitat: Wolf's Trisetum grows in wet meadows and along streams in the subalpine zones. The only material collected for British Columbia is from Mount Assiniboine Park, and that specimen is held in Ottawa. This species is Red-listed by the B.C. Conservation Data Centre (Douglas et al. 1998).
Similar Species: Due to the lack of awns, Wolf's Trisetum is fairly easy to distinguish from other *Trisetum* species.

This genus is probably the most famous grass of all because it is cultivated for flour. Occasionally it is planted as a roadside cover, or it escapes from cultivation, but it rarely persists for more than a few seasons. There are estimated to be 15 species of Old World wheat, but there are numerous cultivars.

Triticum aestivum L.
Wheat

Plant: *Triticum aestivum* is an introduced species that grows to 1.5 m tall. It is an annual or winter annual, with hollow stems. The spike-like flowerhead has one 1- to 2-cm-long spikelet per node.
Leaves and Stem: The smooth, open sheaths have well-developed auricles, and the membrane-like ligules are 1 mm long. The leaves are flat and 5–20 mm wide.
Flowerhead and Flowers: The flowerhead is a spike and it is 5–12 cm long. Spikekets are two- to five-flowered, with firm, keeled glumes that may be blunt or have an awn. The broad lemmas may be keeled and have several obvious non-convergent nerves. These nerves may be a different colour of green, and give the impression of being painted on the lemma. The lemmas may be awnless to long-awned.
Habitat: Wheat occurs along roadsides and in fallow fields. In the Columbia Basin region it grows along the roadside at Grand Forks.
Similar Species: Wheat appears very distinct from any of the native grasses, but it is difficult to determine the type of wheat, because some varieties are awned and others have a beardless phase.



Vahlodea was originally part of *Deschampsia*, but is now separated, based on flat leaf blades, blunt ligules, and purple spikelets.

Vahlodea atropurpurea (Wahlenb.) Fries
Deschampsia atropurpurea (Wahlenb.) Scheele
Mountain Hairgrass

Plant: *Vahlodea atropurpurea* is a native species that grows 15–60 cm tall. It is a loosely tufted perennial with an open, often drooping flowerhead and purplish spikelets.
Leaves and Stem: Sheaths are open and there are no auricles. The ligules are 1.5–3.5 mm long, blunt, and hairy, with a jagged upper edge. The smooth, soft-hairy leaves are deep green, flat, and 4–6 mm wide. The leaf tips can appear prow-like as in the genus *Poa*.
Flowerhead and Flowers: The open, drooping flowerhead is 5–10 cm long. The purplish spikelets often have three flowers. Slightly unequal, purplish glumes are sharply pointed at the tip but also narrow toward the base. Both glumes exceed the second flower in length, therefore concealing it. The 2.5- to 4.0-mm-long lemmas end in a jagged point. The callus has hairs about 1/2 the length of the lemmas. A stout, 2.5-mm-long twisted awn extends from the midpoint of the second lemma.
Habitat: Mountain Hairgrass grows in moist meadows and subalpine forests and along streambanks in the montane to alpine zones. In the Columbia Basin region it is common at upper elevations and occurs at Kokanee Glacier Provincial Park, Mount Revelstoke National Park, Sproat Mountain, Yoho River Valley, Glacier National Park, and Akamina-Kishinena Creek.
Similar Species: *Vahlodea* is similar to *Deschampsia*, but it differs in that the leaves of *Vahlodea* are flat compared to inrolled, the ligule of *Vahlodea* is blunt, not pointed, and the spikelet of *Vahlodea* is purplish, compared to greenish or bronze in *Deschampsia*.

Vulpia includes the weedy annual species once included in *Festuca* (Aiken and Darbyshire 1990). The differing habit, the tendency of *Vulpia* species to set seed by self-fertilizing, and the reduced anther number (one to three, compared to three in *Festuca*), is regarded as enough to place *Vulpia* species in their own genus.

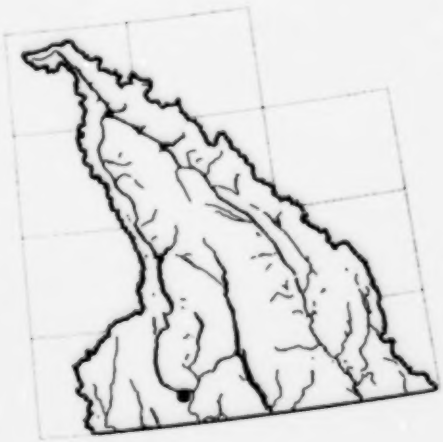
***Vulpia*—Adapted from Hickman (1993)**

1a. Spikelets with four to eleven closely overlapping flowers; spikelet axis hidden; lemma awn less than 7 mm..... *Vulpia octoflora*

1b. Spikelets with two to six loosely overlapping flowers; spikelet axis visible; lemma awn 5–13 mm..... *Vulpia microstachys*

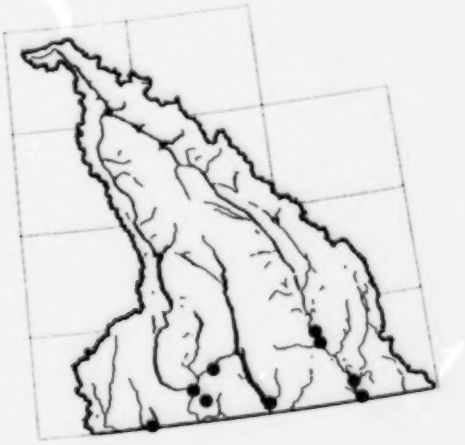
Vulpia microstachys (Nutt.) Munro var. ***pauciflora*** (Scribn. ex Beal) Lonard & Gould
Small Fescue

Plant: *Vulpia microstachys* is a native species that grows 5–40 cm tall. It is a weakly tufted annual with an open flowerhead and branches that appear swept to one side.
Leaves and Stem: Sheaths are open and there are no auricles The hair-like leaf blades are more or less inrolled. The ligules are 0.2–0.5 mm long, and have a rough to fringed margin.
Flowerhead and Flowers: The branches of the somewhat open flowerhead often sweep to one side. Some forms have spike-like flowerheads with more erect branches. Smooth, to slightly hairy, spikelets include two to six flowers. The glumes are unequal to nearly equal in length, and somewhat shorter than the spikelet. In our form (=*Festuca pacifica*) the narrow glumes are more or less hairless. Lemmas bear a 5- to 13-mm-long awn from the tip. Some of the flowers appear to never open, and contain undeveloped anthers.
Habitat: Small Fescue occupies dry meadows, fields, and disturbed sites such as roadsides. It has been collected from only one site (at Castlegar), but likely occurs more widely.
Similar species: Small Fescue belongs to a complex group of variable subgroups (see Hitchcock and Cronquist 1969, Part 1). Also know as *Festuca pacifica* Piper and *F. microstachys* Nutt. Included in this group is *F. reflexa* Buckl. (*Vulpia reflexa* Rydb.).



Vulpia octoflora (Walt.) Rydb.
Six-weeks Grass

Plant: *Vulpia octoflora* is a native species that grows 10–60 cm tall. It is an annual with a slender flowerhead with short branches that point upward.
Leaves and Stem: The sheaths are open and there are no auricles. Hair-like ligules reach 0.2–0.7 mm long and are higher on the sides than in the centre. The leaf blades are fine and inrolled. Stems are ridged lengthwise at the uppermost node.
Flowerhead and Flowers: The slender flowerhead is 2–20 cm long and consists of short upward-pointing branches. There are 4–11 closely placed flowers per spikelet. The unequal glumes are long and narrow and much shorter than the spikelet. Lemmas have a straight, 1- to 7-mm-long awn.
Habitat: Six-weeks Fescue is regarded as a weedy species in Hitchcock (1969). It grows on moderate to dry slopes, in open forests, and on roadsides in the steppe and montane zones. In the Columbia Basin region it occurs at Nelson, Creston, Kootenay, Tobacco Plains, Grand Forks, and Waldo (which is now under Lake Koocanusa).
Similar species: Six-weeks Fescue is part of a complex of plants that were once included in the *Festuca* genus as *Festuca octoflora.* There are three varieties of Six-weeks Fescue in British Columbia: variety *glauca*, variety *octoflora*, and variety *hirtella.* Variety *octoflora* and variety *hirtella* have larger spikelets (5.6–10 mm long) and longer awns (2.5–9 mm long). Variety *glauca* has spikelets that are only 4–5.5 mm long, and 0.3- to 3-mm-long awns.



A hybrid is the offspring of two different parents, varieties or species that differ in one or more heritable characteristics (Woodland, 1997). Most often the cross occurs between two different species, but it can occur between two different genera, species, subspecies or varieties. Grass biologists have recognized that a certain amount of hybridization occurs in nature between species that have overlapping ranges, and therefore many of the subspecies and varieties recognized are actually hybrids. How widespread is this interbreeding in natural populations? In the past few years, research has indicated that this natural hybridization is widespread and important, certainly within genera, but how important is hybridization between genera? Plant breeders artifically cross different genera due to the increased economic value in the new species. In fact, many of the commercial grass mixtures are the result of crosses conducted to breed certain characteristics into the "new" grass. For example, the forage grass *Kemal* is of hybrid origin from *Festuca pratensis* and *Lolium perenne*. In many cases, these hybrids are unable to naturalize and remain isolated to areas where they are continually planted. But in other cases, these artificially created hybrids do naturalize and interbreed with natural populations creating identification problems. So far, natural hybrids between genera have not been recognized, but several authors have recognized x *Elymordeum macounii* as a commonly occurring sterile hybrid between two well known genera, *Elymus trachycaulus* and *Hordeum jubatum*.

x ***Elymordeum macounii*** (Vasey) Barkw.
x ***Agrohordeum macounii*** (Vasey) Lepage
Elymus macounii Vasey A sterile hybrid between ***Elymus trachycaulus*** and ***Hordeum jubatum***
Macoun's Wildrye

Plant: x *Elymordeum macounii* is a native hybrid. It is a loosely tufted sterile perennial with a tall terminal spike and spikelets pressed tightly to the stem axis.
Flowerhead and Flowers: The plants are sterile hybrids and the anthers do not open, even at maturity, therefore remaining attached when they should have withered and disappeared.
Habitat: Dry, open sites in the steppe and montane zones. In the Columbia Basin region, Macoun's Wildrye occurs at Windermere. In areas where forage crops are regularly planted, a number of hybrids have been noticed but not formally recognized in Canada, despite being recognized in England. Two of these have been observed to occur in the Columbia Basin region at Rock Creek—x *Festulolium braunii* and x *Festulolium loliaceum*. It is most likely that they were planted together as a combined seed mix. In the future, it will be interesting to note whether these hybrids occur elsewhere in British Columbia, since they have naturalized in England.

x *Festulolium loliaceum* (Huds.) P. Fourn.
Festuca pratensis* x *Lolium perenne
Hybrid Fescue

Plant: x *Festulolium loliaceum* is an introduced species that grows 30–120 cm tall. It is a loosely tufted perennial with an erect, spike-like flowerhead that may vary from simple and unbranched, to multiple-branched.
Leaves and Stem: The sheath is smooth and the membrane-like ligule is up to 1 mm long. The small, spreading auricles are smooth. The flat leaf blades are hairless, 7 mm wide and can be rough along the edges.
Flowerhead and Flowers: The flowerhead is 10–30 cm long. The oblong spikelets are sterile and are on short stalks. The spikelets are located in two rows on opposite sides of the stem axis. The plant appears very two-dimensional, and as a fresh specimen looks almost as if pressed. The lemmas are awnless.
Similar Species: x *Festulolium braunii* (K. Richt) A. Camus [*Festuca pratensis* x *Lolium multiflorum*]. This hybrid differs from x *F. loliaceum* in having awned lemmas but it also has hairless auricles.

AT = Alpine Tundra
ESSF = Engelmann Spruce–Subalpine Fir
ICH = Interior Cedar–Hemlock
IDF = Interior Douglas-fir
MS = Montane Spruce
PP = Ponderosa Pine
SBS = Sub-Boreal Spruce

List from database	AT	ESSF	ICH	IDF	MS	PP	SBS
1. *Agropyron cristatum* ssp. *pectinatum*			✔	✔		✔	
2. *Agropyron fragile*				✔			
3. *Agrostis capillaris*			✔				
4. *Agrostis exarata*		✔	✔				
5. *Agrostis gigantea*	✔	✔	✔	✔	✔		
6. *Agrostis humilis*	✔	✔		✔			
7. *Agrostis scabra*	✔	✔	✔	✔	✔	✔	
8. *Agrostis stolonifera*			✔		✔		
9. *Agrostis thurberiana*							
10. *Agrostis variabilis*	✔	✔		✔			
11. *Aira caryophyllea*			✔				
12. *Alopecurus aequalis*			✔	✔		✔	
13. *Alopecurus geniculatus*							
14. *Apera interrupta*		✔	✔	✔		✔	
15. *Aristida purpurea* var. *robusta*						✔	
16. *Avena fatua*		✔	✔				
17. *Avena sativa*		✔					
18. *Beckmannia syzigachne*			✔	✔			
19. *Bouteloua gracilis*						✔	
20. *Bromus aleutensis*			✔				
21. *Bromus anomalus*							
22. *Bromus briziformis*			✔	✔		✔	
23. *Bromus carinatus*		✔			✔		
24. *Bromus ciliatus*		✔	✔	✔			
25. *Bromus commutatus*				✔			
26. *Bromus hordeaceus*		✔	✔			✔	
27. *Bromus inermis*		✔	✔	✔	✔		
28. *Bromus japonicus*				✔		✔	
29. *Bromus marginatus*		✔	✔	✔			
30. *Bromus pumpellianus*					✔		
31. *Bromus richardsonii*		✔	✔	✔	✔		
32. *Bromus sitchensis*		✔					
33. *Bromus tectorum*		✔	✔	✔	✔	✔	
34. *Bromus vulgaris*			✔				
35. *Calamagrostis canadensis*	✔	✔	✔	✔	✔	✔	
36. *Calamagrostis montanensis*			✔	✔			
37. *Calamagrostis purpurascens*	✔	✔	✔	✔	✔		
38. *Calamagrostis rubescens*		✔	✔	✔	✔		
39. *Calamagrostis scribneri*							
40. *Calamagrostis stricta*		✔	✔	✔	✔	✔	✔
41. *Calamovilfa longifolia*			✔	✔		✔	
42. *Cinna latifolia*		✔	✔		✔		

List from database	AT	ESSF	ICH	IDF	MS	PP	SBS
43. *Cynosurus echinatus*			✔				
44. *Dactylis glomerata*		✔	✔	✔	✔		
45. *Danthonia californica*	✔	✔					
46. *Danthonia intermedia*	✔	✔	✔				
47. *Danthonia spicata*		✔	✔		✔		
48. *Danthonia unispicata*			✔				
49. *Deschampsia caespitosa*		✔	✔	✔	✔	✔	
50. *Deschampsia danthonioides*			✔				
51. *Deschampsia elongata*		✔	✔	✔			
52. *Digitaria sanguinalis*			✔				
53. *Distichlis spicata*				✔	✔	✔	
54. *Elymus alaskanus* ssp. *latiglumis*		✔					
55. *Elymus alaskanus* ssp. *alaskanus*	✔	✔	✔	✔		✔	
56. *Elymus canadensis*			✔	✔			
57. *Elymus elymoides*		✔		✔			
58. *Elymus glaucus*		✔	✔		✔		
59. *Elymus hirsutus*			✔	✔			
60. *Elymus lanceolatus*		✔		✔		✔	
61. *Elymus trachycaulus*		✔	✔	✔	✔	✔	
62. *Elytrigia pontica* ssp. *pontica*				✔		✔	
63. *Elytrigia repens*			✔	✔		✔	
64. *Festuca arundinacea*			✔	✔			
65. *Festuca baffinensis*	✔						
66. *Festuca brachyphylla*	✔	✔	✔	✔			
67. *Festuca campestris*		✔	✔	✔	✔	✔	
68. *Festuca idahoensis*		✔	✔	✔	✔	✔	
69. *Festuca occidentalis*					✔		
70. *Festuca rubra*			✔	✔	✔		
71. *Festuca saximontana*	✔	✔	✔	✔	✔		
72. *Festuca subuliflora*			✔				
73. *Festuca trachyphylla*			✔				
74. *Festuca viridula*		✔	✔		✔		
75. *Glyceria borealis*			✔	✔	✔	✔	
76. *Glyceria elata*		✔	✔				
77. *Glyceria grandis*	✔		✔	✔			
78. *Glyceria leptostachya*						✔	
79. *Glyceria striata*	✔	✔		✔	✔	✔	
80. *Hierchloe odorata*			✔	✔	✔	✔	
81. *Hordeum brachyantherum*			✔				
82. *Hordeum jubatum*		✔		✔			
83. *Koeleria macrantha*		✔	✔	✔	✔	✔	
84. *Leymus cinereus*		✔		✔		✔	
85. *Leymus innovatus*	✔	✔		✔	✔		
86. *Lolium perenne* ssp. *multiflorum*							
87. *Lolium perenne*				✔	✔		
88. *Melica bulbosa*		✔					
89. *Melica smithii*		✔	✔				
90. *Melica spectabilis*	✔				✔		

APPENDIX 1 (Continued)

List from database	AT	ESSF	ICH	IDF	MS	PP	SBS
91. *Melica subulata*		✔	✔				
92. *Muhlenbergia asperifolia*				✔			
93. *Muhlenbergia filiformis*				✔			
94. *Muhlenbergia glomerata*			✔	✔			
95. *Muhlenbergia richardsonis*				✔			
96. *Oryzopsis asperifolia*	✔	✔	✔	✔	✔		✔
97. *Panicum capillare*		✔	✔	✔		✔	
98. *Panicum occidentale*							
99. *Pascopyrum smithii*			✔	✔		✔	
100. *Phalaris arundinacea*			✔	✔	✔		
101. *Phleum alpinum*	✔	✔	✔	✔	✔		✔
102. *Phleum pratense*		✔		✔		✔	
103. *Phragmites australis*			✔				
104. *Piptatherum exigua*	✔	✔			✔		
105. *Piptatherum hymenoides*		✔		✔		✔	
106. *Piptatherum micrantha*		✔		✔			
107. *Piptatherum pungens*					✔		✔
108. *Poa alpina*	✔	✔	✔	✔			
109. *Poa annua*	✔	✔				✔	
110. *Poa arctica*	✔						
111. *Poa bulbosa*						✔	
112. *Poa compressa*			✔	✔	✔	✔	
113. *Poa cusickii* ssp. *cusickii*	✔	✔		✔		✔	
114. *Poa glauca*	✔			✔			
115. *Poa interior*							
116. *Poa leptocoma*	✔	✔	✔	✔			
117. *Poa nervosa*							
118. *Poa palustris*	✔	✔	✔	✔	✔		
119. *Poa pratensis*			✔	✔	✔	✔	
120. *Poa secunda* ssp. *secunda*	✔	✔	✔	✔	✔	✔	
121. *Poa stenantha*			✔				
122. *Poa trivialis*			✔				
123. *Poa wheeleri*	✔	✔			✔		
124. *Polypogon monspeliensis*				✔		✔	
125. *Pseudoroegneria spicata* ssp. *spicata*		✔	✔	✔	✔	✔	
126. *Puccinellia distans*				✔			
127. *Puccinellia nuttalliana*				✔		✔	
128. *Puccinellia pauciflora*							
129. *Schizachne purpurascens*		✔					
130. *Schizachyrium scoparium*				✔			
131. *Scolochloa festucacea*		✔		✔		✔	
132. *Secale cereale*		✔					
133. *Spartina gracilis*		✔		✔		✔	
134. *Sphenopholis obtusata*	✔		✔		✔	✔	
135. *Sporobolus cryptandrus*						✔	
136. *Stipa comata*			✔	✔	✔	✔	
137. *Stipa curtiseta*				✔			
138. *Stipa nelsonii* var. *dorei*	✔	✔		✔	✔	✔	

APPENDIX 1 (Concluded)

List from database	AT	ESSF	ICH	IDF	MS	PP	SBS
139. *Stipa occidentalis*		✔	✔	✔		✔	
140. *Stipa richardsonii*						✔	
141. *Torreyochloa pauciflora*			✔	✔	✔		
142. *Trisetum cernuum* var. *canescens*		✔	✔	✔			
143. *Trisetum spicatum*	✔	✔	✔	✔	✔	✔	
144. *Trisetum wolfii*	✔						
145. *Vahlodea atropurpurea*	✔	✔	✔	✔			
146. *Vulpia microstachys*			✔				
147. *Vulpia octoflora*			✔	✔		✔	
148. x *Elyhordeum macounii*				✔			
149. x *Festulolium braunii*				✔			
150. x *Festulolium loliaceum*				✔			
TOTAL	33	71	83	89	48	51	4
	22%	47%	55%	59%	32%	33%	3%
	AT	ESSF	ICH	IDF	MS	PP	SBS

Agropyron	
Agropyron cristatum (L. Gaertn.) ssp. *pectinatum* (Biel.) Tzvelev	Crested Wheatgrass
Agropyron fragile Roth	Siberian Wheatgrass
Agrostis	
Agrostis capillaris L.	Colonial Bentgrass
Agrostis exarata Trin.	Spike Bentgrass
Agrostis gigantea Roth.	Redtop
Agrostis humilis Vasey	Alpine Bentgrass
Agrostis scabra Willd.	Hair Bentgrass
Agrostis stolonifera L.	Creeping Bentgrass
Agrostis variabilis Rydb.	Mountain Bentgrass
Aira	
Aira caryophyllea L.	Silver Hairgrass
Alopecurus	
Alopecurus aequalis Sobol.	Little Meadow-foxtail
Alopecurus geniculatus L.	Water Meadow-foxtail
Apera	
Apera interrupta (L.) Beauv.	Silky Bentgrass
Aristida	
Aristida longiseta Steud. var. *robusta* Merr.	Red Three-awn
Avena	
Avena fatua L.	Wild Oat
Avena sativa L.	Common Oat
Beckmannia	
Beckmannia syzigachne (Steud.) ssp. *baicalensis* (Kusnez.) Koyama	American Sloughgrass
Bouteloua	
Bouteloua gracilis (H.B.K.) Lag. Ex Steud.	Blue Grama
Bromus	
Bromus aleutensis Trin. ex Griseb.	Aleut Brome
Bromus anomalus Rupr. ex. Fourn.	Nodding Brome
Bromus briziformis Fisch. & C.A. Mey	Rattle Brome
Bromus carinatus Hook. & Arn. var. *hookerianus* (Thunb.) Shear	California Brome
Bromus ciliatus L.	Fringed Brome
Bromus commutatus Schrad.	Meadow Brome
Bromus hordeaceus L.	Soft Brome
Bromus inermis Leyss.	Smooth Brome
Bromus japonicus Thunb. ex Murr.	Japanese Brome

Bromus marginatus Nees	Mountain Brome
Bromus pumpellianus Scribn.	Pumpelly Brome
Bromus richardsonii Link	Richardson's Brome
Bromus sitchensis Trin.	Alaska Brome
Bromus tectorum L.	Cheatgrass
Bromus vulgaris (Hook.) Shear	Columbia Brome
Calamagrostis	
Calamagrostis canadensis (Michx.) Beauv.	Bluejoint
Calamagrostis montanensis (Scribn.) Scribn.	Plains Reedgrass
Calamagrostis purpurascens R. Br.	Purple Reedgrass
Calamagrostis rubescens Buckl.	Pinegrass
Calamagrostis stricta (Timm) Koel.	Slimstem Reedgrass
Calamovilfa	
Calamovilfa longifolia (Hook) Scribn. var. *longifolia*	Prairie Sandgrass
Catabrosa	
Catabrosa aquatica (L.) Beauv.	Water Hairgrass
Cinna	
Cinna latifolia (Trevir.) Griseb.	Nodding Woodreed
Cynosurus	
Cynosurus echinatus L.	Hedgehog Dogtail
Dactylis	
Dactylis glomerata L.	Orchard Grass
Danthonia	
Danthonia californica Boland	California Oatgrass
Danthonia intermedia Vasey	Timber Oatgrass
Danthonia spicata (L.) Beauv. ex R. & S.	Poverty Oatgrass
Danthonia unispicata (Thurb.) Munro ex Macoun	One-spike Oatgrass
Deschampsia	
Deschampsia cespitosa (L.) Beauv.	Tufted Hairgrass
Deschampsia danthonioides (Trin.) Munro ex Benth.	Annual Hairgrass
Deschampsia elongata (Hook.) Munro ex Benth.	Slender Hairgrass
Digitaria	
Digitaria sanguinalis (L.) Scop.	Hairy Crabgrass
Distichlis	
Distichilis spicata (L.) Greene var. *stricta* (Torr.)	Alkali Saltgrass
Elymus	
Elymus alaskanus (Scribn. & Merr.) A. Love	Alaskan Wildrye
Elymus canadensis L.	Canada Wildrye

Elymus elymoides (Raf.) Swezey	Squirreltail Grass
Elymus glaucus Buckl.	Blue Wildrye
Elymus hirsutus J. Presl.	Hairy Wildrye
Elymus lanceolatus (Scribn. & J.G. Smith) Gould	Thickspike Wildrye
Elymus repens (L.) Nevski	Quackgrass
Elymus trachycaulus (Link) Gould in Shinners	Slender Wheatgrass
Festuca	
Festuca arundinacea Schreb.	Tall Fescue
Festuca baffinensis Polunin	Baffin Fescue
Festuca brachyphylla Schult. and Schult.fil.	Alpine Fescue
Festuca campestris Rydb.	Rough Fescue
Festuca idahoensis Elmer	Idaho Fescue
Festuca minutiflora Rydb.	Little Fescue
Festuca occidentalis Hook.	Western Fescue
Festuca pratensis Hudson	Meadow Fescue
Festuca rubra L.	Red Fescue
Festuca saximontana Rydb.	Rocky Mountain Fescue
Festuca subuliflora Scribn. in Macoun	Crinkle-awned Fescue
Festuca trachyphylla (Hack.) Kraj.	Hard Fescue
Festuca viridula Vasey	Green Fescue
Glyceria	
Glyceria borealis (Nash) Batch.	Northern Mannagrass
Glyceria elata (Nash) M.E Jones	Tall Mannagrass
Glyceria grandis S. Wats. ex A. Gray	Reed Mannagrass
Glyceria leptostachya Buckl.	Slender-spiked Mannagrass
Glyceria pulchella (Nash) K. Schum.	Slender Mannagrass
Glyceria striata (Lam) A.S. Hitchc.	Fowl Mannagrass
Hierochloe	
Hierochloe odorata (L.) Beauv.	Common Sweetgrass
Hordeum	
Hordeum brachyantherum Nevski	Meadow Barley
Hordeum jubatum L.	Foxtail Barley
Koeleria	
Koeleria macrantha (Ledeb.) J.A. Schultes	Junegrass
Leymus	
Leymus cinereus (Scribn. & Merr.) A. Love	Giant Wildrye
Leymus innovatus (Beal) Pilger	Fuzzy-spiked Wildrye
Lolium	
Lolium multiflorum Lam.	Italian Ryegrass
Lolium perenne L.	Perennial Ryegrass

Melica	
Melica bulbosa Geyer ex Porter & Coult.	Oniongrass
Melica smithii (Porter) Vasey	Smith's Melic
Melica spectabilis Scribn.	Purple Oniongrass
Melica subulata (Griseb. in Ledeb.) Scribn.	Alaska Oniongrass
Muhlenbergia	
Muhlenbergia andina (Nutt.) A.S. Hitchc.	Foxtail Muhly
Muhlenbergia asperifolia (Nees & Meyen) Parodi	Alkali Muhly
Muhlenbergia filiformis (Thurb.) Rydb.	Slender Muhly
Muhlenbergia glomerata (Wild.) Trin.	Marsh Muhly
Muhlenbergia richardsonis (Trin.) Rydb.	Mat Muhly
Oryzopsis	
Oryzopsis asperifolia Michx.	Rough-leaved Ricegrass
Panicum	
Panicum capillare L.	Common Witchgrass
Panicum occidentale Scribn.	Western Witchgrass
Panicum oligosanthes Schult. var. *scribnerianum* (Nash)Fern.	Few-flowered Witchgrass
Pascopyrum	
Pascopyrum smithii (Rydb.) A. Love	Western Wheatgrass
Phalaris	
Phalaris arundinacea L.	Reed Canary Grass
Phleum	
Phleum alpinum L.	Alpine Timothy
Phleum pratense L.	Common Timothy
Phragmites	
Phragmites australis (Cav.) Trin. ex Steud.	Common Reed
Piptatherum	
Piptatherum exiguum (Thurber) Barkw.	Little Ricegrass
Piptatherum micranthum (Trin. & Rupr.) Barkw.	Small-flowered Ricegrass
Piptatherum pungens (Torrey) Barkw.	Short-awned Ricegrass
Poa	
Poa alpina L.	Alpine Bluegrass
Poa annua L.	Annual Bluegrass
Poa arctica R. Br.	Arctic Bluegrass
Poa bulbosa L.	Bulbous Bluegrass
Poa compressa L.	Canada Bluegrass
Poa cusickii Vasey	Cusick's Bluegrass
Poa glauca Vahl	Glaucous Bluegrass
Poa leptocoma Trin.	Bog Bluegrass

APPENDIX 2 (Continued)

Poa nemoralis L.	Wood Bluegrass
Poa palustris L.	Fowl Bluegrass
Poa pratensis L	Kentucky Bluegrass
Poa secunda J.S. Presl	Sandberg's Bluegrass
Poa stenantha Trin.	Narrow-flowered Bluegrass
Poa trivialis L.	Rough Bluegrass
Poa wheeleri Vasey	Wheeler's Bluegrass
Polypogon	
Polypogon monspeliensis (L.) Desf.	Rabbitfoot Polypogon
Pseudoroegneria	
Pseudoroegneria spicata (Pursh) A. Löve	Bluebunch Wheatgrass
Puccinellia	
Puccinellia distans (Jacq.) Parl.	Weeping Alkaligrass
Puccinellia nuttalliana (Schult.) A.S. Hitchc.	Nuttall's Alkaligrass
Schizachne	
Schizachne purpurascens (Torr.) Swallen	False Melic
Schizachyrium	
Schizachyrium scoparium (Michx.)	Little Bluestem
Scolochloa	
Scolochloa festucacea (Willd.) Link	Rivergrass
Secale	
Secale cereale L.	Rye
Setaria	
Setaria viridis (L.) Beauv.	Green Bristlegrass
Spartina	
Spartina gracilis Trin.	Alkali Cordgrass
Sphenopholis	
Sphenopholis obtusata (Mich.) Scribn.	Prairie Wedgegrass
Sporobolus	
Sporobolus cryptandrus (Torr.) A. Gray	Sand Dropseed
Stipa	
Stipa comata Trin. & Rupr.	Needle-and-thread Grass
Stipa curtiseta (A.S. Hitchc.) Barkw.	Short-awned Porcupine Grass
Stipa hymenoides Roem. & Schult.	Indian Ricegrass
Stipa nelsonii Scribn. var. *dorei* Barkw. & Maze	Columbian Needlegrass
Stipa occidentalis Thurb. ex S. Wats. var. *pubescens* Maze, Taylor & MacBryde	Stiff Needlegrass
Stipa richardsonii Link	Spreading Needlegrass
Stipa spartea Trin.	Porcupinegrass

APPENDIX 2 (Concluded)

Thinopyrum	
Thinopyrum ponticum (Podp.)	Tall Wheatgrass
Torreyochloa	
Torreyochloa pauciflora (J.S. Presl.) Church	Weak False-manna
Trisetum	
Trisetum cernuum Trin.	Nodding Trisetum
Trisetum spicatum (L.) Richt.	Spike Trisetum
Trisetum wolfii Vasey	Wolf's Trisetum
Triticum	
Triticum aestivum L.	Wheat
Vahlodea	
Vahlodea atropurpurea (Wahlenb.) Fries	Mountain Hairgrass
Vulpia	
Vulpia microstachys (Nutt.) Munro var. *pauciflora* (Scribn. ex Beal) Lonard & Gould	Small Fescue
Vulpia octoflora (Walt.) Rydb.	Six-weeks Grass
Hybrids	
x *Elyhordeum macounii* (Vasey) Barkw.	Macoun's Wildrye
x *Festulolium braunii* (K. Richt) A. Camus	Hybrid Fescue
x *Festulolium loliaceum* (Huds.) P. Fourn.	Hybrid Fescue

____ Is the plant **annual** or **perennial**?
____ Are there **rhizomes** or **stolons**?
____ Is the **ligule** made up of hairs or a membrane?
____ How long is the ligule?
____ Are there **auricles**?
____ Are the leaf **blades** flat or **inrolled**?
____ List the surface type for the leaf **sheath** (**smooth**, **rough**, **hairy**, etc.)
____ Are the sheaths **open** or **closed** (how far along the length)?
____ Is the flowerhead a **spike** or **branching**?
____ If a spike, how many spikes at each **node**?
____ Is the spikelet **round** or **compressed**?
____ Are there **sterile flowers** (or florets)?
____ Are the sterile flowers above or below the fertile ones?
____ How many flowers to a **spikelet**?
____ Are the **glumes** as long as, longer than, or shorter than the spikelet?
____ How many **nerves** on the back of the first glume?
____ How many **nerves** on the back of the second glume?
____ How long is the **glume**?
____ Does the glume have an **awn**? How long is it?
____ How many nerves are on the lemma?
____ Are the nerves of the lemma **parallel** or **converging** at the tip?
____ Is the lemma **rounded** or **compressed-keeled** on the back?
____ Is the lemma **awnless**, **awned on the back**, or **terminally awned**?
____ Where is the lemma **awn** attached, on the tip or on the back?
____ Is the lemma either **webbed** or **bearded** at the base? (yes or no)?
____ Is the **palea** as long as the lemma?
____ Is there a **callus**?
____ Is there any obvious colour on the stem or the flowerhead?

Alpine: Those parts of mountains that rise above the cold limits of trees.

Annual: Complete the life-cycle (seed to seed) in one growing season.

Anther: The pollen-bearing part of the stamen.

Apical: Pertaining to the apex or tip of a plant organ.

Appressed: Pressed flat against or close to another organ, as flowerhead branches against the axis or hairs against a stem or leaf.

Arctic: Pertaining to the unforested regions that occur north of the treeline.

Ascending: Rising upward, as stems that curve upward from the base; or branches of a flowerhead that slope upward at an angle of about 40–70°.

Auricles: Projecting lobes or appendages of leaf tissue, usually paired, and arising from the junction of the leaf sheath and the blade. Projecting on either side of the collar.

Awn: A bristle—usually at the end of a glume, lemma, or palea.

Axis: General term for a central, supporting grass organ (e.g., a rachilla or, in particular, the main or central stem of a compound flowerhead).

Basal: That part near to, or forming part of, the base. In grasses, leaves can be basal or along the stem.

Bearded: Long, often stiff hairs at the base of the lemma. In some genera their presence is a key feature to identification.

Biennial: Growing for two years—usually producing flowers and fruit in the second year.

Bifid: Two-lobed or split at the apex.

Blade: Broad part of the leaf that extends from the stem.

Blue Listed: Vulnerable, rare taxa that could become candidates for the Red List in the forseeable future. A vulnerable species is of special concern because of characteristics that make it particularly sensitive to human activities or natural events.

Bract: Any of the reduced or modified leaves of the flowerhead and upper part of a shoot; in grasses, the glumes and lemmas are bracts.

Bunchgrass: A grass habit that produces a large number of side shoots. The current year's leaf growth is usually basal and previous year's sheaths can persist.

Caespitose: Growing in tufts (i.e., with several or many stems growing closely together). Referred to as "tufted" in this paper.

Callus: A hard projection that appears to be an extension of the lemma.

Callus-scar: Scar left on the thickened base of the lemma after abscission from the rachilla.

Caryopsis: The fruit of grasses; the grain.

Ciliate: With a fringe of hairs on the margin.

Clasping: Surrounding or holding tightly, as a type of auricle.

Collar: Junction area of the leaf sheath and blade.

Compressed: Unusually flattened in one plane, as the spikelets of some grasses. The spikelet can be compressed across the back so that the glumes and lemma appear flattened (dorsal) or from the sides so that the spikelet or the glumes appear keeled (lateral).

Contracted: Closely bunched together, as the flowerhead branches with the axis in some grasses.

Culm: The above-ground stem of a grass.

Deciduous: Part of the plant that falls away at the end of its normal function. Awns are sometimes deciduous.

Decumbent: With a horizontal or inclined base that curves upward into an erect or ascending tip, as some grass stems.

Depauperate: Small or poorly developed; the condition of impoverished or dwarfed plants that are below average size.

Drooping: Bending or arching downward, especially as the tips of flowerhead branches weighted down by spikelets.

Endemic: Confined to a particular, often relatively small, geographic area.

Erect: Standing upright.

Fertile lemma: A lemma with a functional flower, either male or female, inside it. If you find any parts inside the lemma at all you can consider it a fertile lemma. See also sterile lemma.

First glume: The lower glume (toward ground); usually smaller.

Flexuous: Having relatively firm bends.

Flower: The basic unit of a grass spikelet, having one flower subtended and usually enclosed by the lemma and the palea.

Geniculate: Abruptly bent or twisted.

Glume: One of a pair of bracts, found at the base of a grass spikelet.

Grass bald: An open area in an otherwise forested zone, and often in a mountainous region, in which grasses are a significant or dominant part of the vegetation; grass balds often occur in regions having summers with low precipitation, and are usually confined to areas of shallow soil (as on mountain summits occurring below the subalpine zone) and/or steep south-facing or west-facing slopes.

Hairy: Bearing hairs (trichomes) of any sort.

Herbaceous: Herb-like.

Hyaline: Thin and translucent or transparent.

Indurate: Hardened; firm; retaining its shape.

Internode: The part of a stem or culm between two successive nodes.

Introduced: Plant origins from outside North America; introduction either accidental or intentional.

Involute/Inrolled: Rolled inwards, as the margins of a grass leaf blade, exposing the lower surface and concealing or partially concealing the upper surface.

Keeled: Having a conspicuous, central, longitudinal ridge (resembling the keel of a ship), as the lemma of some grasses.

Lanceolate: Lance-shaped; long and tapered to a point.

Lemma: The outer, usually larger (away from the axis), bract of the pair of bracts that enclose a grass flower. The inner bract is called the palea.

Ligule: In grasses, applied to the tongue-shaped appendage arising at the junction of the leaf sheath and blade, and partially surrounding the stem.

Montane: Pertaining to mountain slopes, and often, in particular, to the mostly forested zone extending downslope from the subalpine forest zone.

Nerve: A longitudinal vein of a leaf, lemma, or other organ.

Nodding: Bent to the side, as the tip of a grass flowerhead that is not erect.

Node: The part of a stem to which a leaf is attached; in grasses this is often a thickened part of the stem. This is the base of the sheath for the leaf above, from which the measurement should be taken for the amount of opening in the sheath.

Ovary: The structure that encloses the young undeveloped seeds.

Palea: The inner (toward the axis) of the pair of bracts that enclose a grass flower.

Panicle: A compoundly branched flowerhead, as in many grasses.

Pedicel: The stalk of a single flower; in grasses, the stalk of a single spikelet.

Perennial: Growing for more than two growing seasons, usually flowering each year.

Prow-shaped: Shaped as the forward part of a ship; said of some grass leaf blade tips that have their margins turned upward—and sometimes inwards as well—resembling a ship's prow.

Pubescent: Having short, soft hairs; sometimes loosely used for bearing hairs (trichomes) of any sort (i.e., hairy).

Rachilla: The axis of a spikelet.

Rachis: In grasses, the main or central stem of a simple (non-compound) flowerhead such as that of a spike (compare *axis*).

Red Listed: Candidate for legal designation as an endangered or threatened species. An endangered species is an indigenous species facing extinction in British Columbia A threatened species is one that is likely to become extinct if limiting factors are not reversed.

Reflexed: Bent backward.

Rhizomatous: Having rhizomes.

Rhizomes: The underground stems of a plant; has roots and shoots at the nodes.

Second glume: The upper glume (i.e., the distal one).

Sheath: The part of a grass leaf that wraps around the stem. It is important to distinguish the sheath from the stem. A hairy sheath, mistaken for a stem, may mislead you in the key.

Spikelet: In grasses, the compact unit of the flowerhead consisting of one or two glumes at the base and one to several florets borne on the rachilla.

Spreading: Directed outward; in grasses, often used to refer to hairs on an organ (e.g., a leaf sheath), or to flowerhead branches that form an angle with the axis between that of ascending and patent (i.e., between about 70 and 90°).

Sterile lemma: A lemma with no functional flower or flower parts inside.

Stolon: Above-ground stem of a plant that produces roots and shoots at the nodes.

Subalpine: Pertaining to the forest zone immediately below the alpine tundra.

Submontane: Pertaining to the steppe zone in mountainous areas occurring below the montane zone.

Throat: Variously, the area between, or the angle formed by, the upper margins of the leaf sheath.

Truncate: As if cut off; having the apex or base of an organ transversely straight or nearly straight.

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